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Big Sky Clearwater

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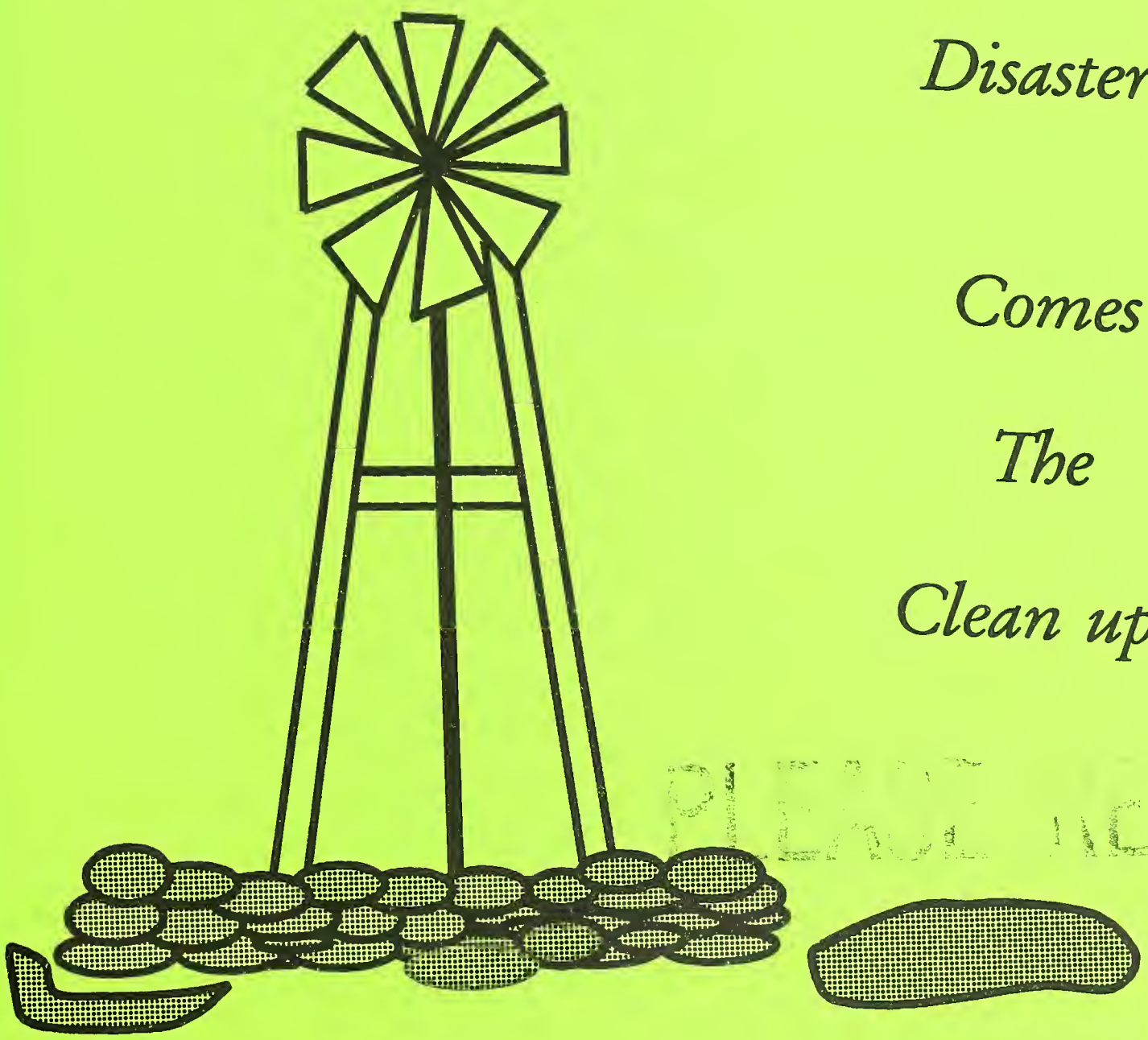
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This publication welcomes articles of interest and random pieces of information regarding anything to do with water. If you have ideas or information you would like to share with other people involved in the water and wastewater field, please contact the Water Quality Division.

An article may consist of your thoughts and ideas about something you may have experienced, perhaps such information could help someone else in their day-to-day work. It could also be a technical article developed from research information and library resource material. If it has to do with water and you think it may be of interest, please send it to us (Attn: Editor) or give us a call at (406) 444-2406.

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PUBLIC WATER SUPPLY PROGRAM UPDATE

Jim Melstad

Reorganization

The 1995 Legislature passed legislation that reorganized several state agencies. The programs within the Water Quality Division were transferred to a new agency, the Department of Environmental Quality (DEQ), on July 1, 1993. Mark Simonich is the director of DEQ. The Public Water Supply Program and the Operator Certification Program will be transferred to a new division within DEQ, the Permitting and Compliance Division. As part of this reorganization, Mark Simonich (and the PWSP) hopes to be able to work with EPA to better prioritize the current regulatory requirements. If you have ideas on how we can improve, please let us know.

We will move to the Metcalf Building (where the Department of Natural Resources was previously located) in mid-March. Our mailing address (Box 200901, Helena 59620-0901) will remain the same, but our street address will be 1520 East Sixth Avenue. We will be located on the second floor (ground level floor on the south side of the building) in the east wing. Please stop by and see us the next time you are in Helena!

Fees

On behalf of the Public Water Supply Program (PWSP), I would like to thank all public water suppliers for your prompt payment of the service connection fees. Water suppliers deserve to know how the fees are being used. Following is a brief description of the current use of the fees. Fees are used primarily to provide contracted services for services to water suppliers. Some of these activities have been curtailed or postponed because EPA's budget has not been finalized.

1. **Technical assistance**. The initial contract was awarded to Montana Rural Water Systems, Inc. (MRWS) in 1993. Much technical assistance and assistance with regulatory compliance (including Phase 2/5 sampling) was provided through the initial contract. The contract has expired and requests for proposals are expected to be mailed soon for a new contract. Services would include routine and emergency technical assistance, training and assistance with compliance related issues.

2. **Groundwater under the influence of surface water (GWUISW) determinations.** The Montana Bureau of Mines and Geology (MBMG) at Butte is contracted to perform determinations of vulnerable groundwater wells. Work currently is underway in the Missoula area.

3. **Wellhead protection**. MBMG is also contracted to delineate "capture zones" to identify areas that should be protected to avoid contamination of groundwater wells serving the public.

4. **METC trainer**. DEQ has contracted with Montana State University-Northern to provide another trainer for the Montana Environmental Training Center at Great Falls. Barb Coffman was hired to fill this position.

5. **Sanitary surveys**. Sanitary surveys are an important preventive activity that have been performed by state water supply programs across the U.S. for many years. Sanitary surveys help water suppliers identify potential problems that could place a water supply at risk of contamination. Montana's PWSP was criticized by the General Accounting Office in 1993 for performing infrequent and inadequate surveys. To address this shortcoming, Darrell McNenny of Missoula has been contracted to perform sanitary surveys in counties where local health departments do not contract for this service. Approximately 10 local health departments are also contracted to provide this service.

6. **Plan review**. The program currently receives about 350 sets of plans and specifications for water and wastewater system improvements each year. In order to perform a timely review, Casne and Associates has been contracted to provide engineering consultant services. Federal grant funding, service connection fees and plan review fees provide funding for this service.

7. **Database programming.** EPA's complex regulations have resulted in significant hardware and software expenditures. Systems Management, Inc., of Portland OR has been contracted for development of the software. Programming is nearing completion, but quarterly data reporting to EPA keeps staff very busy addressing noncompliance, data entry and software "bugs".

8. **Operator certification exam questions and study materials.** Donna Jensen of Helena has been contracted to develop better water operator exam questions and study materials. This project is also nearing completion.

9. **Rocky Boys Rural Water System**. MRWS provides contracted educational and technical expertise in the initial organization efforts for this proposed rural water system in north central Montana. The system would potentially serve many water users on existing systems, including public water suppliers with noncompliance problems.

10. **Staff salary and operating expenses.** Approximately 33% of the fee income ($200,000 of the $600,000 total fee income per year) is used for staff salaries, benefits and operating expenses. Unfortunately, the legislature has never authorized enough staff to meet the recommendations of the 1990 Public Water Supply Task Force for an **interim program**.

<u>Staff contacts</u>

Following are the staff contacts for various topics. Our general phone number for the PWSP is 444-4549, and 444-2691 for the Operator Certification Program. Individual extension numbers are listed next to each person's name.

Operator certification	Shirley Quick	444-2691
Surface water treatment	John Camden	4019
	Terry Campbell	5312
	Rick Cottingham	4769
	Marc Golz	4071
Training	Rick Cottingham	4769
	Marc Golz	4071
	METC	454-2728
Lead and copper rule	Terry Campbell	5312
(a new LCR contact person will replace Terry soon!!!)		
Phase 2/5	Gary Wiens	5318
	Craig Pagel	5313
Plan review	Mark Smith	5311
	Gary Wiens	5318
	Craig Pagel	5313
	Marc Golz	4071
Total coliform rule	All DEQ staff listed above	
Discharge permits	Mike Pasichnyk	5326
	Joe Strasko	2783
	Fred Shewman	5329
SRF wastewater loans	Tom Slovarp	5323

IDENTIFYING POTENTIAL POLLUTION SOURCES TO A PUBLIC WATER SUPPLY

Fortunately, most Montana water system operators have not experienced the frustration of trying to deal with a chronic contaminant detect in their water supply. It's true that we tend to spend a fair amount of time dealing with the aftermath of a positive bacteriological sample by re-sampling, disinfecting, and submitting check samples the following month. But despite our best efforts, we often see an end to the problem without a concrete idea of what the actual source of the bacteria really was. It often just simply goes away. We then rely on our continued routine sampling to alert us to the bacteriological quality of our water.

Sources of bacteria in a water system can be quite varied and transient. Sampling error in the form of improper sample collection is probably the most frequent cause of positive bacteriological reports followed closely by doing repairs or maintenance without adequate disinfection at system closure. Actual bacteriological contamination in an aquifer is rarely the cause of a positive bacteriological report. In contrast, the origin of chemical contamination in a public water supply often **is found** in the source water aquifer which can have very serious long term implications.

This article will focus on potential sources of ground water contamination, outline the regulation of these sources in Montana, and describe some planning steps an operator can take to become proactive rather than reactive in managing contaminants. But before jumping in, let's read the following to see if this could happen to you:

As the operator of a PWS serving a community of 124 people in west central Montana you are contacted by your certified lab because your recent composited VOC sample had detects for three of the regulated compounds. *You're really not too concerned because they are simply detects which don't exceed the MCLs and your two wells have never had a detect in the past. You submit two more samples (not composited) to the lab. You're a little peeved about the cost of the extra samples.*

You are again contacted by the lab when one of the confirmation samples exceeds the MCL for one of the regulated VOCs and continues to show detects for the other two which were detected in the first sample. The VOC sample from the other well is reported as non-detect for all regulated compounds. *You're now a little more concerned because of the MCL violation but you figure you can shut down one well due to low winter demand. You also know that giving public notice will cause questions from system users but will be able to reassure them because you plan to only use the clean well. The VOC hits also mean you'll now need to submit quarterly samples which is another unanticipated lab cost.*

Four months have passed. Not much has changed. Your quarterly VOC samples still show an MCL violation for one of the regulated VOCs in the well that you shut down and no detects in your remaining production well. But you're entering the summer irrigation season and know you'll have trouble meeting demand with only one well. You did a visual survey of the area around your wells and can't see any obvious sources of the contamination. *You're beginning to get some heat from an adjacent property owner because you'd agreed to allow him to tap into your system but his small subdivision proposal has been denied by the reviewing authorities because of your inadequate water supply. He's already spent $8000 on engineering and wants to get started. Also, using only one well increased draw down in the well. Occasionally you pump a little sand which is causing customer complaints. The remaining pump is working a lot harder now too, in fact, it looks like you'll need to rebuild it sooner than later. The increase in lab fees is eating into the money you were setting aside for pump maintenance.*

A hot summer passes. Your requests for water conservation have resulted in little cooperation. You put off the pump rebuild because you have no back-up and the pump in the production well burns up in mid-summer. Your customers howled and formed a citizens committee. The committee really can't do much but do manage to harass you whenever possible by making an issue of every little problem that comes up. The subdivision developer has filed a lawsuit to recover the $8000 he spent on engineering. At the end of summer you are contacted by your lab because the latest VOC samples still show a MCL violation in the well you shut down. And now, the contamination is also found in the remaining production well. *You slowly realize that shutting down one well resulted in a corresponding increase in demand on your second well. This extra stress has drawn the contaminants from the pollution plume to the remaining well. You wish you knew more about VOCs, aquifer flow direction, and ground water contamination. The increasing costs to the system are no longer a simple matter of lab fees but now include a few thousand dollars for a VOC treatment system (short-term remedy) and many thousands of dollars for well replacement (long-term remedy). You admit to yourself that some planning before the problem began would have helped you deal with the problem much more effectively. At the request of the owners, you tender your resignation and begin looking for a new job.*

Chemical contamination of ground water can result from man's activities at or below the ground surface. Rarely intentional, chemical ground water contamination can quickly render an aquifer undrinkable. A little education and planning can go a long way in helping identify threats to your ground water resource which may allow you to prevent threats from turning into reality. A comprehensive mechanism called Wellhead Protection is in place in Montana which is designed to help public water supplies deal with potential threats to their ground water resource.

Wellhead Protection is a program by which you: 1) identify the area that contributes water to your well(s) based on pumping rates and aquifer characteristics (this is called delineation); 2) identify potential threats to ground water within the delineated area, and; 3) decide how to manage those identified threats. It is a local effort that encourages local control.

In this article, please note that you'll frequently see the phrase "**near your well(s)**". The meaning of this phrase is very site specific. Historically we've used 100 feet or closer to mean "near your well(s)" and we called it the well control region or well exclusion zone. When considering the larger sources of ground water contamination described in this article you'll probably want to extend the area out to 500 feet or even 1000 feet. Keep in mind that the preceding paragraph briefly described the development of a wellhead protection plan that includes something called delineation which is a process using specific aquifer and well characteristics to more accurately define "near your well(s)".

Now, let's look at ground water pollution.

Class V Injection Wells

Description of the Problem--Class V Injection Wells are also known as shop sumps, french drains, infiltration pits, or leaching pits. They have been used all over Montana for disposal of shop wastes through floor drains, car wash wastewater disposal, industrial type stormwater disposal, and for numerous other wastes. Of course, infiltration sumps only work where soils or the subsurface is permeable. Unfortunately, those same permeable soils often are connected to ground water which may allow wastes to enter the underlying aquifer resulting in contamination by VOCs, solvents, gasoline, diesel, and petroleum products. Both direct disposal of contaminated waste into a sump or allowing contaminated run-off to soak into the ground may be a source of contamination to ground water and can threaten a water supply.

Regulatory Status--Class V Injection Wells have been regulated by federal law (administered by EPA) for several years through a permitting program. Under this program, many Class V Injection Wells have been disconnected and filled. Class V Injection Wells may also be subject to certain hazardous waste regulations and clean-up requirements if the injection well has received certain listed wastes. Lastly, Class V Injection Wells are subject to the provisions of the Montana Water Quality Act which prohibits the placement of waste in a location that will pollute state waters (ground water is state water). In other words, dumping contaminated waste through a floor drain into a sump or otherwise allowing contaminated wastewater to soak into the ground is prohibited if it will enter ground water.

What Can You Do--Do a visual survey of businesses or residences near your well(s) to identify activities which may require the use of solvents, thinners, degreasers, detergents, lubricants, hydraulic fluids, fuels, inks, industrial glues, etc. Contact the business owner to find out what materials are used, how bulk product is stored, and how waste is managed. As conditions dictate, encourage their cooperation in your ground water protection effort. You may want to refer the owner to the MSU- Extension Service, Pollution Prevention Program at (406)994-3451. MSU-Extension can provide non-regulatory and confidential assistance to most types of business or industry found in Montana. If you believe an acute or immediate risk to your water supply may exist, contact the Enforcement and Legal Support Section at the Montana Department of Environmental Quality at (406)444-2406.

Underground Storage Tanks

Description of the Problem--Underground storage tanks are typically used in Montana to store fuel products and in some cases are used to store wastes. Unfortunately, out of sight tends to mean out of mind and many steel tanks with associated underground pipes have been installed that were not regularly checked for leakage. We've discovered that painted but otherwise unprotected steel buried in the ground tends to rust which may allow leakage and in some cases, ground water pollution.

In the past 10-15 years there have been about 1000 confirmed releases from underground tanks in Montana with about half of those reaching ground water. Several documented cases of benzene in public water supplies have occurred. Soil conditions and fuel properties dictate the potential for pollution from tanks.

It is likely that small, old, buried home heating oil tanks may still exist in some communities as these tanks were abandoned when natural gas became available decades ago. Home heating oil tanks were often simply disconnected

and now their locations are both hidden and forgotten. Luckily, small quantities of the heavier heating oils may not move significantly through the subsurface or have been naturally attenuated over time.

Above ground storage tanks are somewhat easier to monitor but are also vulnerable to damage or vandalism which may cause leakage. Again, soil conditions and fuel properties dictate the potential for pollution from tanks.

Regulatory Status--Underground tanks are regulated by the Tanks Program at the Montana Department of Environmental Quality through an underground tank registration program that was started in the 1980s. Leak testing and tank maintenance is required for underground tanks in Montana. Many of the old underground storage tanks have been removed and areas of contamination cleaned up as a result of tank registration.

Above ground storage tanks are subject to the provisions of the Montana Uniform Fire Code which is administered by the local or state Fire Marshall.

What Can You Do--You can contact the Tanks Program at (406)444-5970 to find out if any underground tanks are located near your well(s) and request a status report of leak testing and tank maintenance in your area of concern.

You can do a visual survey to locate above ground tanks near your well(s). Try to determine if spill containment structures exist around these tanks. If not, contact the local fire marshall or deputy state fire marshall to request they require spill containment be installed. You can also contact the business owner to find out if emergency absorbent or spill containment materials are readily available.

Landfills

Description of the Problem--Contact between water and refuse produces a pollutant called landfill leachate. This contact can occur as rain percolates through the refuse or as ground water reaches the refuse from underneath. Landfill leachate can be high in BOD, TDS, solvents, chemicals, and heavy metals. Leachate composition is very dependent on the material in the landfill and is highly variable from site to site.

Historically, most Montana towns had a dump or landfill located in the coulee or creek bottom on the edge the community. As towns grew and time passed landfills have been moved and old sites were abandoned. Their replacements are much more sophisticated.

The most modern landfills are built on impervious liners equipped with leak detection and leachate collection systems. When full, modern landfills will be covered with another impervious liner over which soil will be placed and vegetation established. Leachate production is minimized and any which is collected will be tested and treated at a sewage treatment plant or sent to a hazardous waste facility. A few such landfills exist in Montana today.

Some of our older operating or abandoned dumps may still be producing leachate which discharges to ground water.

Local, informal, illegal dump sites should be a significant cause for concern because materials placed in these areas are not monitored. These sites can become repositories for hazardous materials that wouldn't be accepted by a licensed landfill.

Regulatory Status--Landfills are regulated by state law administered through the Waste Management Division of the Department of Environmental Quality. Design and construction standards must be met by regulated facilities. All facilities are subject to operating standards. Many sites are equipped with monitoring wells to check leachate impacts to ground water. Montana law does provide for farmer or rancher waste disposal on their privately owned property.

The dumping of waste or refuse at sites not described above is generally prohibited by state law. Any law officer including sheriffs, highway patrol, and even game wardens can enforce the general dumping prohibitions.

What Can You Do--You can contact the Waste Management Division at (406)444-1430 to find out the status of operation or maintenance of any landfill near your well(s). You may want to request a copy of the past 2 or 3 site inspections performed by the regulatory agency to see if problems have been noted and if recommendations are being implemented.

You may also want to do a visual survey to see if any unlicensed dumps exist near your wells. These sites can be referred to the Waste Management Division.

Spills

Description of the Problem--Spills can occur anywhere at any time. This includes highways, rural roads, agricultural lands, industrial sites, railroads, and even waterways. Most spills are small but any spill can contaminate the underlying ground water if it is not promptly cleaned up. Spills can enter barrow pits, storm drains, or other drainage ways to become a problem quite a distance from the original spill site.

Spills of reportable quantities of toxic or potentially hazardous materials occur on a daily basis in Montana. A reporting network exists which uses county sheriffs, the highway patrol, and a statewide Disaster & Emergency Services (DES) communication system to ensure that the 300-400 spills reported every year are properly managed.

Approximately 5% of the reported spills require extensive clean-up and, in some cases, on-going monitoring.

Regulatory Status--Any spill that will pollute state waters must be reported to the DES communication system under the authority of the Montana Water Quality Act. Spills may also be regulated under the state hazardous waste laws. Exceptions to the reporting requirements are spills of crude oil in quantities of 10 barrels or less or refined petroleum product in quantities of 25 gallons or less if it does not enter state water and is immediately contained and removed.

What Can You Do--You should contact the DES coordinator in your county to inform them of the location of your well(s). You should request to be notified of any spills that occur near your well(s). If a spill does occur in an area of concern, contact the regulatory agency to ensure that proper clean-up recommendations are implemented.

You can also contact businesses storing or using potentially hazardous materials near your well to see if they have spill absorbent or containment materials on hand. Most spills are not a hazard if they are contained but some businesses overlook the common sense step of having containment materials on site.

Septic Systems

Description of the Problem--Approximately 140,000 individual septic systems exist in Montana. Septic systems typically consist of a septic tank for settling solids followed by a drainfield for disposal of the remaining liquid. Septic systems reduce viruses, bacteria, and nitrates in sewage but these substances are usually not eliminated hence potential pollutants may be discharged to the ground via the drainfield. In many areas of Montana discharge from drainfields is a form of ground water recharge especially in those regions with a permeable subsurface or high ground water.

It is easy to see that an improperly located septic system or simply a high concentration of septic systems may result in conditions which threaten your ground water supply. Compounding the risk may be the disposal of hazardous materials, solvents, or other chemical wastes into septic systems by uninformed homeowners.

Regulatory Status--Generally, septic systems in Montana are regulated by the county health department under county ordinance. County septic system ordinances must meet the minimum standards established by the Montana Department of Environmental Quality. Minimum design standards are intended to ensure that septic systems do not pollute state waters.

In some cases, the location or placement of a septic system may also be dictated by the Montana Sanitation in Subdivisions Act. Septic systems on Reservations in Montana may be regulated by a tribal entity.

What Can You Do--Contact the local health department to find out if any areas near your well(s) are served by septic systems then focus on sub-areas that might be a special concern due to proximity to your well(s), permeable soils, high ground water, or a high concentration of septic systems. With the cooperation of the local health department, you can develop a mailing list of system owners living in these sub-areas. Coordinate with the local health department to mail out annual septic system maintenance reminders. Include educational material in the annual mailing to ensure that people living in identified sub-areas are aware of your concerns about ground water pollution as well as proper septic system maintenance and operation.

A useful method to assess potential threats caused by a concentration of septic systems may be to establish one or more sampling sites using domestic well(s) within the area of concern. Sample twice per year for nitrates and chlorides to establish baseline levels and continue this sampling to monitor trends. The cost to monitor for a few parameters may be minimal compared to the benefit of the advance warning that this type of sampling can provide. Of course, bacteriological sampling won't be of much use nor will a single round of samples; you must sample over a period of years to establish and evaluate any trends that occur.

Sanitary Sewers

Description of the Problem--All cities, numerous smaller communities, and many subdivisions in Montana are served by public sewage systems utilizing sanitary sewers or underground sewer lines. Historically, a problem for sewer system operators has included ground water infiltration into sanitary sewers because the excess flow can overload the sewage treatment system. More recently, leakage from sanitary sewers has been identified as a minor but usually overlooked concern for public water system operators.

A ground water contamination problem can occur when "sinker" type chemical pollutants (heavier than water) are dumped into the public sewer system. "Sinkers" tend to settle on the bottom of the sanitary sewer pipe near the low areas at joints and may actually leak through the joint into the surrounding soil. If the pipe is located in an area of high ground water or permeable soils, the "sinker" may migrate downward into the aquifer and threaten your water source.

Sewer mains serving residential areas of a community are generally not susceptible to this problem but older sewer lines serving the more industrial type areas should be evaluated.

Regulatory Status--The design and construction of public sewer systems is regulated by the Montana Department of Environmental Quality. Leakage from sewer mains would fall under the provisions of the Montana Water Quality Act which prohibits the placement of waste in a location that will pollute state waters. The handling of certain hazardous materials or waste is regulated by the Hazardous Waste Program of the Department of Environmental Quality

What Can You Do--Determine if sewer lines are located near your well(s) by contacting the public sewage system operator. Discuss the age and type of sewer material with the operator to assess the vulnerability of the ground water to contamination by sewer line leakage. Find out if the operator requires shops or other businesses to pre-treat wastes flowing through sewer lines near your well(s). Do a visual survey of the area served by any sewer lines near your well(s). "Sinker" type materials include solvents used in degreasers, paints, glues, dry cleaning, and electronics. Contact any identified businesses in the area of concern to inquire about solvent use, storage, and waste disposal. While the risk of ground water contamination may not be significant, your inquiries present an opportunity to meet with property owners and briefly discuss ground water pollution prevention.

As conditions dictate, encourage their cooperation in your ground water protection effort. You may want to refer the owner to the MSU-Extension Service, Pollution Prevention Program at (406)994-3451. MSU-Extension can provide non-regulatory and confidential assistance to most types of business or industry found in Montana. If you believe an acute or immediate risk to your water supply may exist, contact the Enforcement and Legal Support Section at the Montana Department of Environmental Quality at (406)444-2406.

Wastewater Disposal Systems and Lagoons

Description of the Problem--Most communities, numerous trailer parks, and many subdivisions in Montana are served by community sewage treatment systems. This usually involves primary and secondary treatment and may frequently be associated with a discharge to the ground through lagoon leakage or an infiltration structure. Deactivation of bacteria and viruses usually occurs in the treatment process system but nitrates, ammonia, and sulfates may reach the ground water in significant concentrations in some areas.

Regulatory Status--The design and construction of public sewage systems and any discharge from a public sewage system is regulated by the Montana Department of Environmental Sciences. Administrative rules establish design standards and discharge permit limits which are intended to ensure that systems do not pollute state waters.

Lagoon leakage and infiltration ponds fall under the provisions of the Montana Water Quality Act which prohibits the placement of waste in a location that will pollute state waters. Additionally, any facility which negatively impacts a PWS may be subject to a nuisance action through the local board of health.

What Can You Do--Contact the county health department to find out if any community sewage system uses unlined lagoons or infiltration structures near your well(s). If an infiltrating type sewage system exists in an area of concern, contact the Montana Department of Environmental Quality at (406)444-2406 to find out if the infiltration impact on ground water has been evaluated. If not, request an assessment and asked to be formally informed of the results.

A useful method to assess potential threats caused by a community sewage system may be to establish one or more sampling sites using domestic well(s) within an area of concern. Sample for nitrates and chlorides to establish baseline levels and continue this sampling to monitor trends.

Animal Confinement Areas and Barnyard Wastes

Description of the Problem--Feedlots, corrals, calving areas, winter feeding areas, or other places where animals are concentrated can be significant sources of pollutants such as nitrogen, phosphorous, and chlorides. We usually think of the local stockyard or feedlot as an obvious animal confinement facility but should also include the many suburban areas that have high concentrations of horse or other small animal enclosures. Manure, bedding, and feed wastes may be stockpiled for long periods of time in exposed areas subject to rainfall and snow melt resulting in contaminated run-off. And in many areas of Montana this snow melt and rainwater is a form of ground water recharge especially in settings with a permeable subsurface or high ground water. It is easy to see that the improper handling of animal waste can pollute ground water.

Regulatory Status--Large confinement facilities and others specifically designated are regulated by the Montana Department of Environmental Quality through a permitting process. Contaminated run-off that enters ground water falls under the provisions of the Montana Water Quality Act which prohibits the placement of waste in a location that will pollute state waters. Facilities which negatively impact a PWS may be subject to a nuisance action through

the local board of health.

What Can You Do--Do a visual survey to determine if any of these facilities exist near your well(s). Contact the Natural Resource Conservation Service office in your county to find out if the soil type at the facility is highly permeable, tight, or in between. If you believe that a risk to ground water exists, you may want to contact the Enforcement and Legal Support Section at the Montana Department of Environmental Quality at (406)444-2406. Pollution prevention information for large and small property owners is also available at this number or from the MSU-Extension Service at (406)994-3451.

Pesticides/Fertilizers/Irrigation

Description of the Problem--Irrigation can contribute to ground water contamination in a couple of ways. Irrigation water may pick up pesticides or nutrients from fertilizers before soaking into the ground where it becomes ground water recharge. This may be a significant concern in areas with highly permeable soils or high ground water. Keep in mind that many pesticides are either taken up by plants, soil bound, or broken down by soil organisms and sunlight. Pesticides applied according to label instructions generally pose little risk to ground water.

Chemigation systems which apply fertilizers or chemicals through an irrigation system must be equipped with back-flow preventors to ensure that treated water does not re-enter the source water well through back-flow or back pressure. Operators familiar with the concept of back-flow prevention can easily envision the risk associated with chemigation.

Bulk fertilizer and fertilizer handling facilities can become significant contributors of nutrients to ground water if proper management practices are not used. In at least one Montana community a PWS well was contaminated and had to be replaced due to poor practices at a bulk fertilizer distributor which lead to very high nitrate levels in the ground water.

Regulatory Status--Pesticides must be handled and applied according to the label directions. Pesticide applicators are regulated by the Montana Department of Agriculture. Allowing pollutants to enter ground water is prohibited by the Montana Water Quality Act.

What Can You Do--Do a visual survey to determine if flood irrigation is practiced near your well(s). Contact the Natural Resource and Conservation Service office in your county to find out if the soil type in the area of concern is highly permeable, tight, or in between. If you believe the site may be prone to significant infiltration of irrigation water which could threaten your well(s), contact the property owner and/or the Field Services Bureau of the Montana Department of Agriculture at (406)444-3730 to express your concern. Ask that chemical use at the site be considered relative to your ground water concerns through an aquifer vulnerability evaluation at the site. You may also want to request that the Montana Department of Agriculture sample your drinking water supply for chemicals being applied in the specific area of concern if they're not part of your current analysis list.

If your visual survey finds a chemigation facility near your well(s), you can contact the property owner to find out if a backflow preventor is properly installed and maintained on the system. Also look for fertilizer distributors or businesses that handle fertilizer. If you believe that a risk to ground water exists, you may want to contact the Enforcement and Legal Support Section at the Montana Department of Environmental Quality at (406)444-2406.

****

Now that you've read about some of the ways in which ground water can become contaminated, you may want to consider putting yourself in a position to be proactive rather than reactive. We all hope that these things won't happen and in most cases, they won't. If you see some room for improvement with your pollution prevention efforts, try a few of the suggestions to ensure you're in the best possible position should a contamination event threaten your well(s). You can also contact the Wellhead Protection Program at (406)444-4806 to show you how to develop a specific wellhead protection plan for your public water supply.

From the desk of...

Joe Meek
Wellhead Protection Program
Water Quality Division

BIOLOGICAL INTEGRITY OF FOUR FLATHEAD VALLEY STREAMS

by Loren Bahls, Montana Department of Environmental Quality

Between 1984 and 1994, monitoring was conducted on Ashley Creek, East Spring Creek, the Stillwater River and the Whitefish River to assess biological and water quality changes brought on by population growth, land use changes, and pollution controls.

Total ammonia and total phosphorus declined dramatically in **Ashley Creek** following installation of advanced treatment at the Kalispell WWTP and passage of a phosphate detergent ban in Flathead County. Even with this improvement in water quality, biological integrity in Ashley Creek worsened because of the significantly larger volume of treated wastewater discharged by the Kalispell plant after it accepted Evergreen community sewage in 1994. Biological integrity in Ashley Creek also declined at a sampling station upstream from the Kalispell WWTP, presumably because of increased nonpoint source pollution.

Biological integrity in **East Spring Creek** rated "good" to "excellent" in reaches that have been rehabilitated by the Flathead Conservation District. The site below Farrier's Dam had "poor" biological integrity because of solar heating of ponded water behind the dam.

On November 30, 1994, nitrate nitrogen concentrations in the **Stillwater River** increased six-fold between Logan Creek and Kalispell. This decline in water quality was accompanied by a decline in biological integrity from "excellent" to "good". Nonpoint sources of pollution were responsible for this decline.

The discharge from the Whitefish WWTP was found to impair biological integrity in the **Whitefish River**, even after phosphorus removal and the phosphate detergent ban. Impairment was somewhat greater in 1994 than in 1992, perhaps because of a larger volume of discharge in 1994 (due to additional sewer hookups) and the several bypasses of the treatment system that occurred between 1992 and 1994. Biological integrity improved somewhat between Highway 40 and Evergreen. This improvement may represent recovery from the residual effects of the Whitefish WWTP discharge.

Nutrient controls that have been implemented to protect Flathead Lake from accelerating eutrophication have been only partly successful at restoring the biological integrity of Flathead Valley streams. Potential ecological improvements to be realized by advanced wastewater treatment at the Kalispell and Whitefish WWTPs have been offset by the larger volumes of wastewater that are now being treated and discharged by these facilities. Intermittent bypasses of the treatment system at the Whitefish WWTP may have also contributed to biological impairment in the Whitefish River. Although significant water quality improvement has been documented in East Spring Creek, nonpoint source pollution continues to degrade Ashley Creek, the Stillwater River, and other streams in the Flathead Valley.

KALISPELL ADVANCED WASTEWATER TREATMENT AND BIOLOGICAL NUTRIENT REMOVAL FACILITY

By Joni Emrick, Plant Manager

Wastewater from the City of Kalispell was formerly treated in a secondary wastewater treatment plant consisting of an activated biofilter with associated primary and secondary clarifiers and sand filters, and anaerobic and aerobic digestion. Chemical disinfection was achieved with chlorine, and phosphorus removal was carried out through chemical alum addition, with a MPDES Permit limit of 2 mg/L. The Plant effluent discharge is to Ashley Creek which drains into Flathead River and then into Flathead Lake.

Phosphorus is generally the nutrient which controls or limits algae growth in lakes. In 1984, Stanford et.al. (University of Montana Biological Station) published a report showing that this was also true for Flathead Lake. In addition, the amount of phosphorus entering the Lake was increasing each year because of population growth and more disturbance of the land surface and its' protective vegetation. As a result of these environmental pressures, several recommendations were made to government agencies, local communities, and concerned citizens to reduce the amount of phosphorus entering Flathead Lake. One of the recommendations was to impose a 1 mg/L effluent limit for phosphorus on all point sources (such as wastewater treatment plants) in the Flathead Lake drainage basin.

In 1989 a contract was awarded for the design of a 3.1 MGD advanced wastewater treatment plant incorporating biological phosphorus removal. The decision to use "bugs" to remove phosphorus and to use ultraviolet light disinfection made the process environmentally safe as chemicals would not be added to Flathead Lake. In addition, although the Plant effluent criteria did not specify ammonia and total nitrogen concentrations, the MPDES permit did restrict the ammonia concentrations to being low enough to avoid instream toxicity in Ashley Creek to protect fish and other small biological life. As a result of this requirement, it was decided to design the Plant to achieve year-round nitrification.

In order for the requirement of phosphorus removal to be met principally by biological means, a sophisticated process configuration capable of creating the required environmental conditions for biological phosphorus removal was needed. The process selected for the Kalispell Plant is the modified University of Cape Town (UCT) process. It consists of a multi-cell configuration, called a "bioreactor" which has four different reaction zones through which the wastewater passes in series: an anaerobic zone, first and second stage anoxic zones, and an aerobic zone. A simplified schematic of the process is presented in Figure 1. The phosphorus removal process was "enhanced" by the use of short chain fatty acids (volatile fatty acids) such as acetate and propionate added directly to the anaerobic zone. Research carried out indicated that a sufficient volume of short chain volatile fatty acids could be generated on site with a primary sludge fermenter, consisting of a complete mix tank and a gravity thickener.

Although there was no requirement for nitrogen removal at Kalispell, biological denitrification was incorporated into the process design as it represents a significant reduction in aeration power required and it was anticipated that at some future date there might be a total nitrogen discharge limit.

This Plant, the first biological nutrient removal facility in Montana, began operation in October 1992. Other unique features of the Plant include:

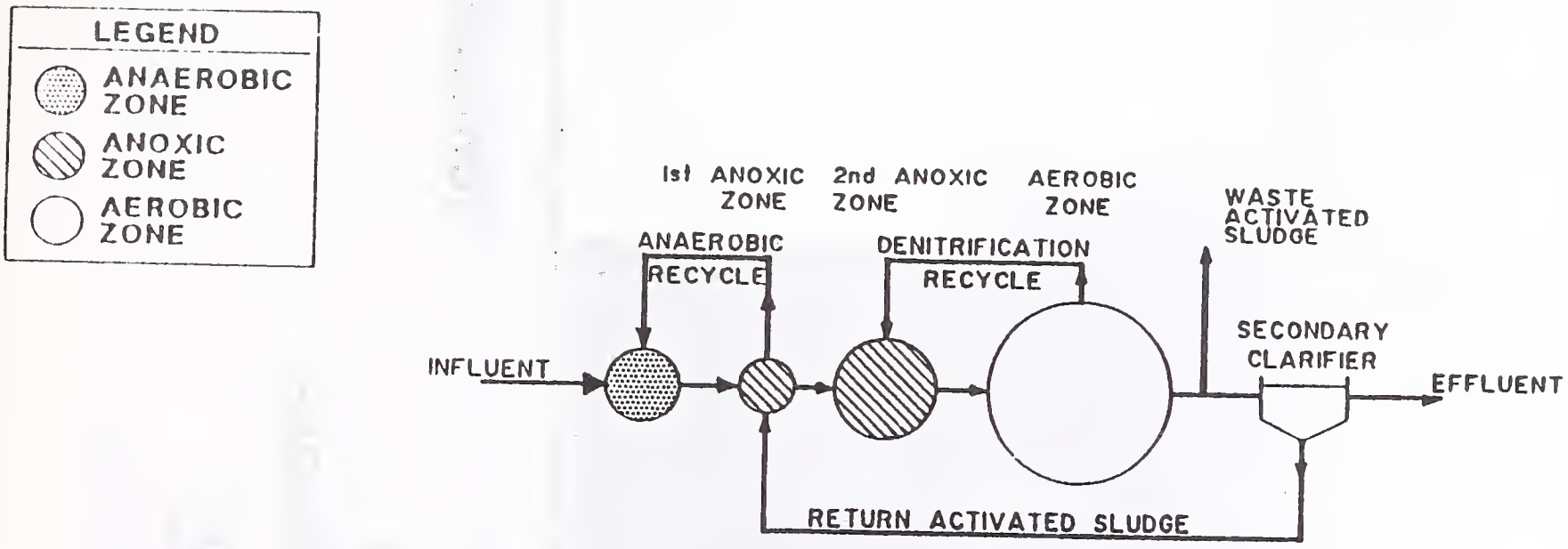
- A "pista" type swirl degritter
- Rectangular primary clarifiers
- A flow equalization basin whose principle function is to ensure a steady organic loading and hydraulic flow rate to the bioreactor during the nightly low flow period
- Four continuous backwash effluent rapid sand filters
- An effluent reaeration basin
- One anaerobic and two aerobic digesters for the treatment of the waste primary sludge and for treatment of the scum from the primary and secondary clarifiers
- A sludge handling room equipped with two dissolved air floatation units for waste activated sludge thickening, and two belt filter presses for primary and waste activated sludge dewatering. Each unit is equipped with a dedicated polymer feed system.
- A chemical feed facility capable of adding sodium acetate or alum solutions to the bioreactor in the event of phosphorus process excursions or repairs required to the fermenter unit
- A Programmable Logic Controller (PLC) for programming information on how to run equipment, and a Supervisory Control and Data Acquisition (SCADA) system that collects and stores data for trending dissolved oxygen, recording Plant flows and alarms, etc.

The nutrient removal performance during the Plant's first years of operation is impressive, as can be seen in Figures 2-4. This level of treatment has been achieved through complex and sophisticated processes and equipment control systems and also with zones and units that can be changed and modified to meet a desired operational mode. The six Plant Operators-the Plant Manager, the Laboratory Technician/Operator, and four Operators performed approximately 4500 laboratory tests and 860 work orders in 1995 to monitor Plant performance, meet Permit discharge requirements, and keep equipment in working order.

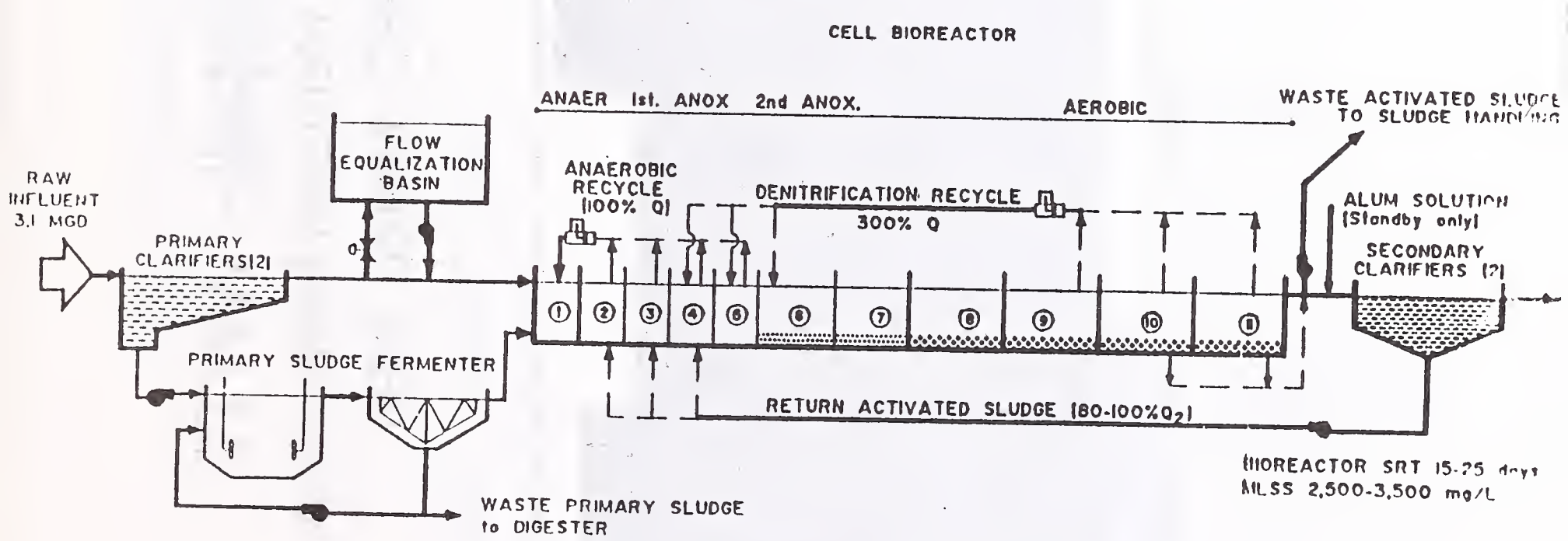
The Plant's by-product, the nutrient rich sludge, is pressed to remove approximately 20% moisture, checked for heavy metal and nutrient levels, and hauled under contract to Glacier Gold Compost, Inc., located 35 miles NW of Kalispell. In 1995, the Operators hauled 558 dry tons of this sludge, which is then mixed with wood chips and sold as "organic compost" throughout the U.S.

We are always willing to give tours to anyone who can stop by. You can reach the Plant by calling 406-758-7817.

Stanley



MODIFIED UCT PROCESS



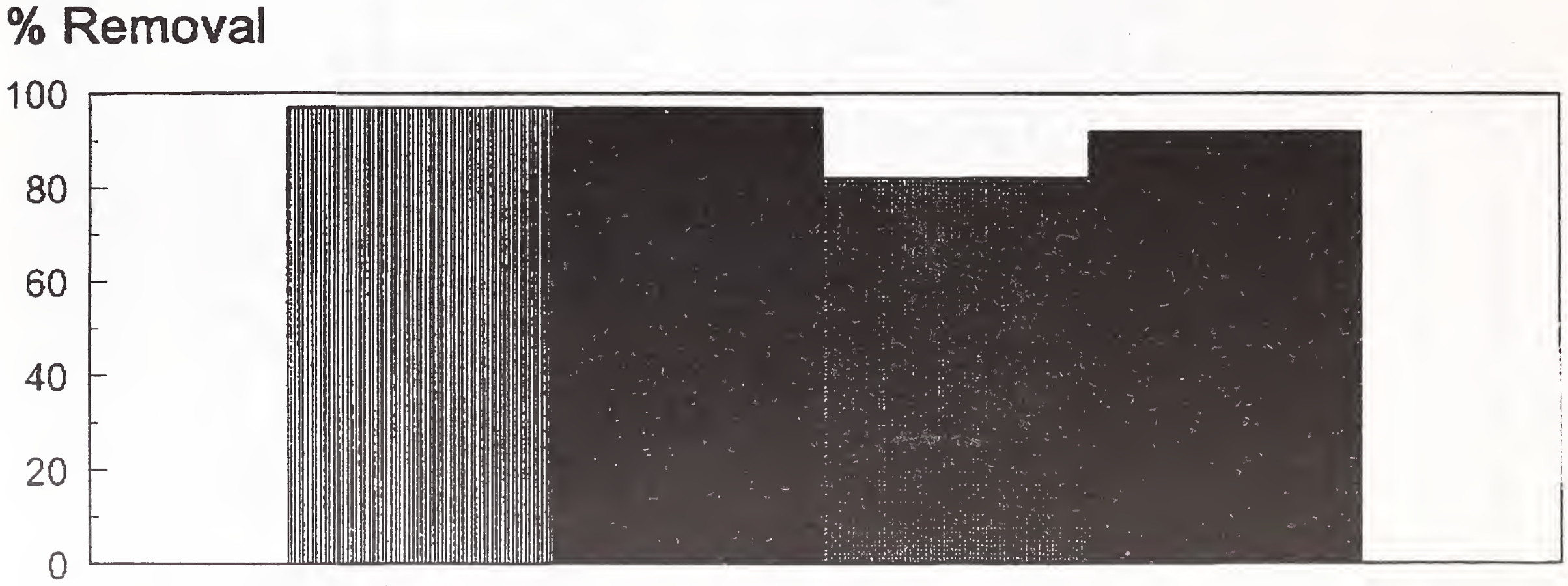
KALISPELL ADVANCED WASTEWATER TREATMENT PLANT

PROCESS FLOW SCHEMATIC FOR PRIMARY SLUDGE FERMENTER & BIOREACTOR

City of Kalispell - WWTP

Average Nutrient Removal Performance

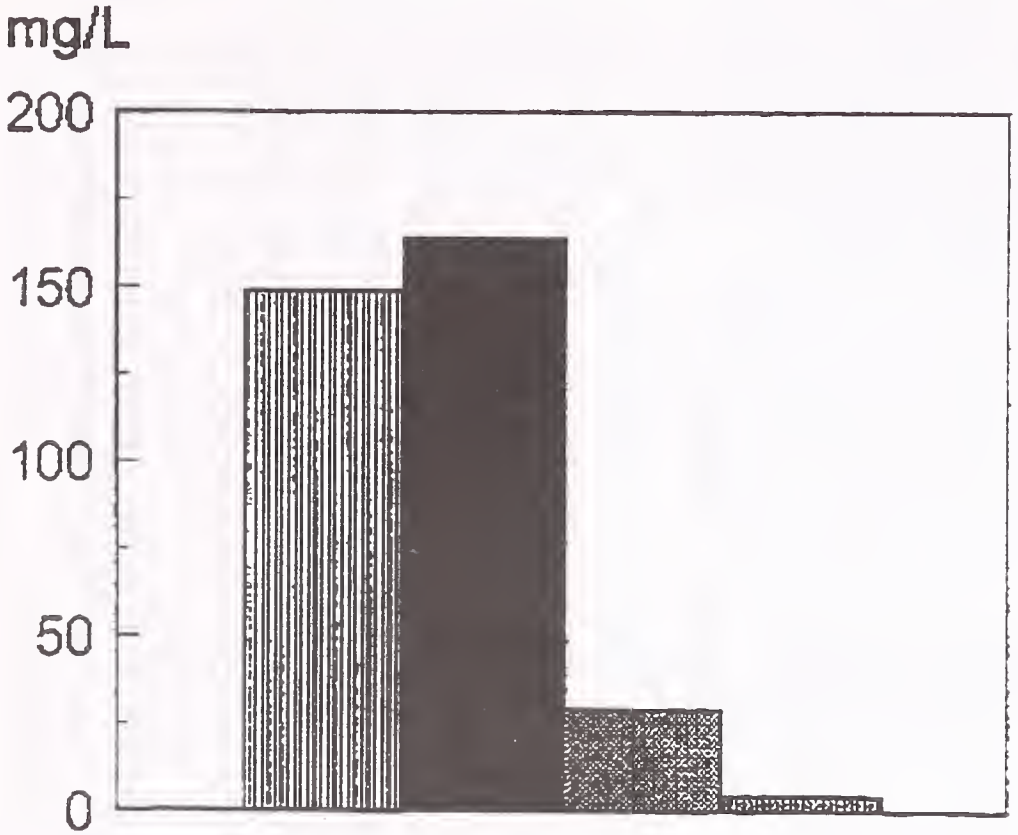
October 1992 - March 1995



	% Removals
BOD	97
TSS	97
Total N	82
Total P	92

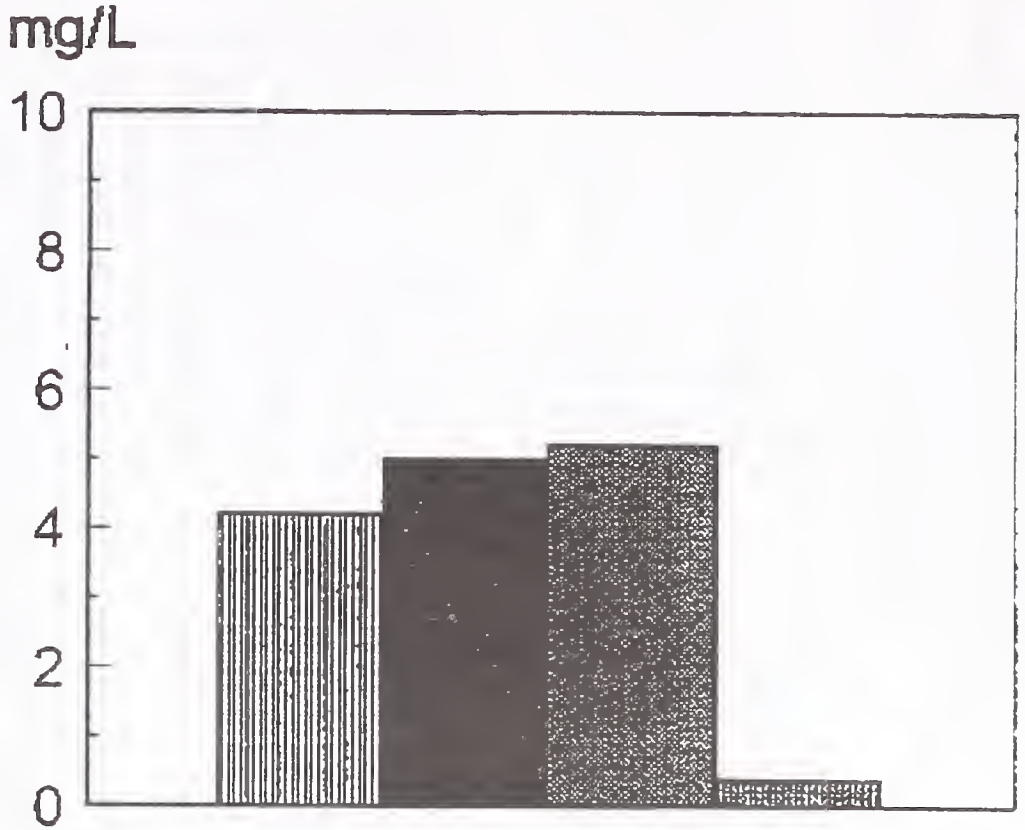
City of Kalispell - WWTP
Montana, USA

October 1992 - March 1995
Average Influent Data



	influent
BOD	149.00
TSS	164.00
TKN	29.20
Total P	4.75

October 1992 - March 1995
Average Effluent Data



	Effluent
BOD	4.20
TSS	5.00
Total N	5.20
Total P	0.38

Montana District forms Water Watchers as Education effort

September 1995 issue of US Water News

HELENA, Mt - As the first county in Montana to form a water quality protection district, Lewis and Clark County has paced the state in its water education efforts. The district, which was established by a bill passed by the Montana Legislature in 1991, has initiated a water quality education program for elementary students called "Water Watchers."

Since the inception of Water Watchers last year, some 600 fourth grade students in the Helena area have become involved in the program, said Susan Palermo, health educator for the Lewis and Clark City/County Health Department. The county Water Quality Protection District currently is developing a second phase of the educational program for fifth graders. "The Water Watchres program represents the district's investment in tomorrow's citizens and their commitment to protect the county's water into the 21st century," Palermo stated.

The Water Watchers program consists of four levels, she explained. After being intorduced to the program with a comic book written and illustrated by two local high school students, future Water Watchers pledge to complete all of the activities. Level two of the program consists of several hands-on activities in the classroom that help the students understad some basic principles about water. "They learn about the water cycle, aquifers, the limited amount of freshwater on the earth, and the connections all living things have to water," noted Palermo.

Level three consists of a field trip where the students experience a water environment on a first-hand basis. After the field trip, the students complete at least one other activity that gives them an opportunity to actually do something to protect their water resources, she said. "One group wrote and presented public service announcements over their shcool's public address system," said Palermo. "They told their fellow students what they had learned about the harm household hazardous wastes could do to underground water supplies if disposed of improperly. Another class made posters and sent some of them to their parents' workplaces for display." Another class, she added, wrote letters to the editor of the local paper to express their concern for water quality protection.

Under state law, Montana water quality protection districtrs may set fees to fund its programs. The Lewis and Clark County Water Protection District has a budget of over $100,000 from fees and grants to implement its water quality program. Besides the Water Watchers educational program, the district also is involved in monitoring water quality and quantity, conducting inventories of stormwater runoff, and establishing wellhead protection area.

Besides Lewis and Clark County, Missoula County has become the second county in the state to establish a water quality protection district. Gallatin County has announced its intent to form a district covering the Gallatin Valley at Bozeman, while Silverbow and Butte counties are planning the formation of districts.

VIRUS MONITORING OF GROUNDWATER

Bob Ward Mountain Water Company

Most people who think about viruses this time of year are usually thinking about that nasty flu that has been going around. However, monitoring for viruses in groundwater is becoming an important area of study as part of the upcoming Groundwater Disinfection Rule. Groundwater systems have an opportunity to participate in establishing base line information on virus occurrence.

AWWA Research Foundation has hired a company to test 500 wells for virus occurrence. The results of the first one hundred samples have been surprising in the large number of positive samples. Three different tests are run on each sample to determine if viruses are present. Cell cultures have been positive in 14% of the tests; PCR have been positive 37% of the time and bacteriophage have been positive in 38% of the samples. 15% of the samples were positive for coliform bacteria.

Cell culture detects live viruses in the samples while PCR determines if virus parts are present but not if they are alive. Bacteriophage is like a virus that affects bacteria but not humans. These test are run on 1500 liters of unclorinated well waters. The tests are very involved and not many labs are able to run the tests. The cost of the tests for all three methods is about $1000 per sample.

However, the Research Foundation is looking for more sample sites and will do the virus testing for free if the water system will collect the sample. The sites that are potential sample sites must be well characterized and not have a history of positive coliform samples. Well characterized means having a well log, some information on the aquifer and well construction information. If you are interested in volunteering, contact Morteza Abbaszadegan of American Water Works Service Company. His address is AWWSCo. Belleville Lab, 115 Illinois St., Belleville, IL 62220 and the phone number is 1-618-235-3600.

Mountain Water conducted monthly virus testing on two of its wells in areas near Missoula that are not sewered. We sampled the wells monthly for one year and had no positive using cell culture, 4% positive using bacteriophage and 16% positive samples using PCR. The aquifer is only about 30 feet deep where we were sampling and near septic tanks and horse pastures. The test were done by Dr. Dan DeBorde at the University of Montana Division of Biological Science. We sampled 3000 liters of water and used the same or better methods than in the nationwide study but had a far lower incidence of positive samples. We also did split samples with the Research Foundation but do not have the results yet.

If you have any questions or want more information, contact Bob Ward with Mountain Water at 1-800-721-5570 or Dan DeBorde at 1-406-243-2389.

Helena Valley Aquifer Groundwater Nitrate Concentration Trends

A trend study of nitrate concentrations in the groundwater of the Helena Valley Aquifer conducted by the Lewis & Clark County Water Quality Protection District (Drake 1995) finds that higher nitrate concentrations coincide with higher septic system density. Data was first collected in 1990 as part of a USGS study of the Helena Valley Aquifer (Briar 1992) and the district repeated the study in 1994. The study will be repeated in 1998 at which time a statistical analysis of concentrations will determine whether the changes are due to normal fluctuations or identifiable trends.

The Helena Valley Aquifer is contained in a broad, sediment-filled basin (Quaternary gravel deposits over Tertiary lake-bed deposits) bordered by bedrock on the north, south and southwest. Surface water and groundwater drain toward Lake Helena in the northeast portion of the basin. Specifically, the study identifies and quantifies trends in nitrate concentrations found in the Helena Valley Aquifer with respect to (a) location in the 110 square mile Helena Valley, (b) level of the water table, (c) time, and (d) septic system density.

Seventy-seven test wells were selected using a regionalized random sampling plan to ensure a statistically valid data set. The wells included USGS monitoring wells and domestic wells with descriptive well logs. The wells where sampled during the summer months and water levels measured for preparation of hydrographs. Between 1990 and 1994, seventeen domestic wells were monitored to describe seasonal variations in water levels and nitrate concentrations.

Background nitrate values in the aquifer ranged from 0.1 to 0.5 mg/l. Nitrate concentrations and water levels were relatively consistent during the two sampling years. Nitrate values ranged from 0.07 to 6.8 mg/l in 1990 to 0.01 to 7.84 in 1994 with the highest values recorded in the upper 30 feet of the aquifer. Nitrate concentrations increased by 2.5% from an average of 1.25 mg/l to 1.70 mg/l. Seasonal variations could mask long term trends in nitrate concentrations as many wells showed seasonal variation between 1990 and 1993 greater than the trend data collected in the sampling years. The area with nitrate concentrations above 1 mg/l increased by 19%; so that in 1994, groundwater in 53% of the valley area demonstrated nitrate concentrations above 1 mg/l. There was a widespread increase in the nitrate concentrations of groundwater which previously exhibited lower nitrate values; while groundwater with higher nitrate concentrations spread very little. This is consistent with distribution patterns of nonpoint sources of pollution. Septic systems increased by 26% from 2,475 to 3,081 in this same time period.

Density of septic systems showed the most dramatic correlation with nitrate concentrations. The highest nitrate concentrations coincided with areas having the highest population and septic tank densities. Another apparent source of higher nitrate concentrations are large cemeteries which in addition to containing graves also are fertilized and irrigated to maintain the greenery.

Briar, D.W. 1992. "Hydrogeology of the Helena Valley-fill Aquifer System, West-Central Montana." U.S.G.S. Water-Resources Investigations Report 92-4023, Helena, MT.
Drake, Vivian. 1995. "Helena Valley Aquifer Groundwater Nitrate Concentration Trends." Lewis and Clark County Water Quality District. Helena, MT. 76pp.

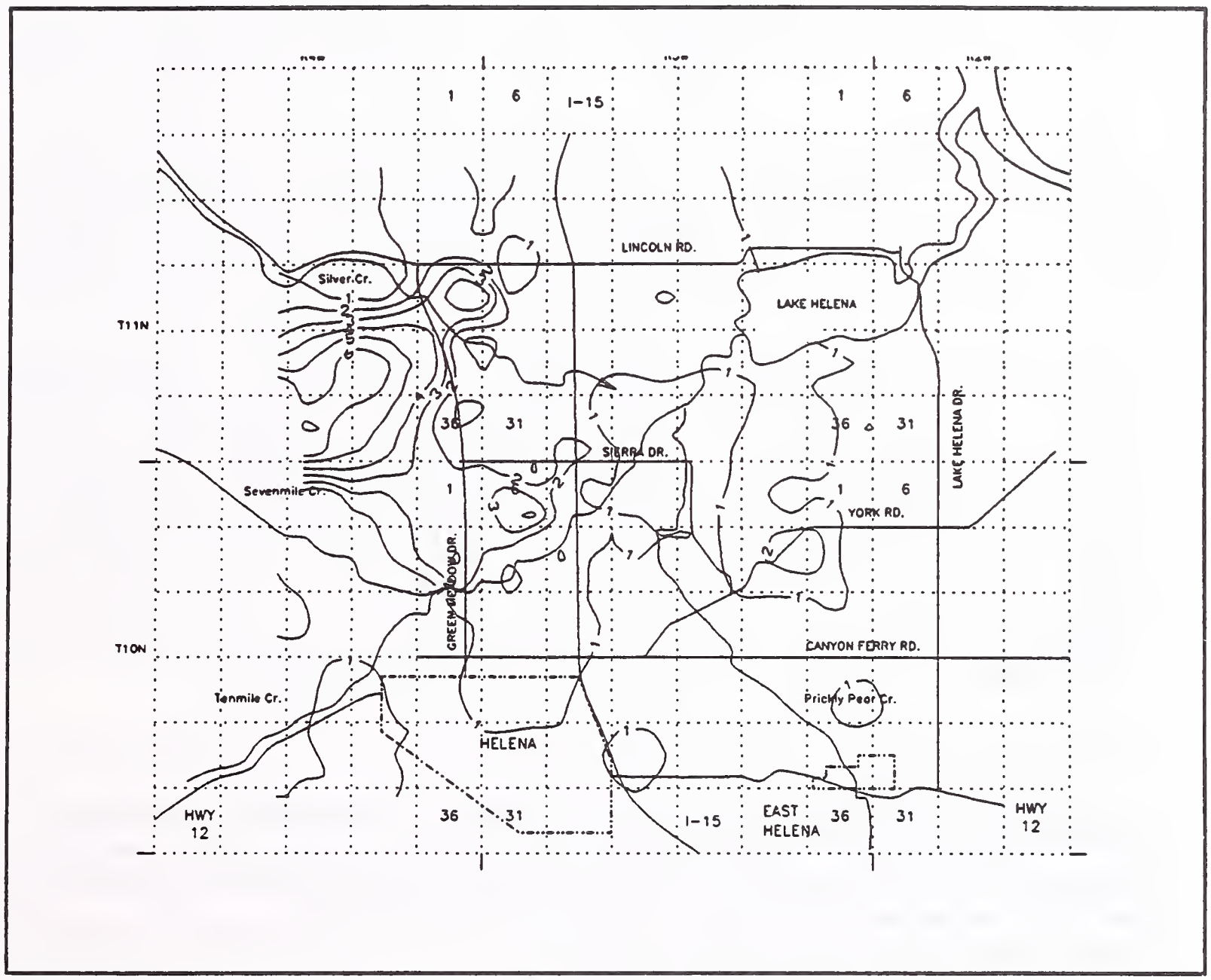


FIGURE 12. 1990 Helena Valley Aquifer Nitrate Concentrations

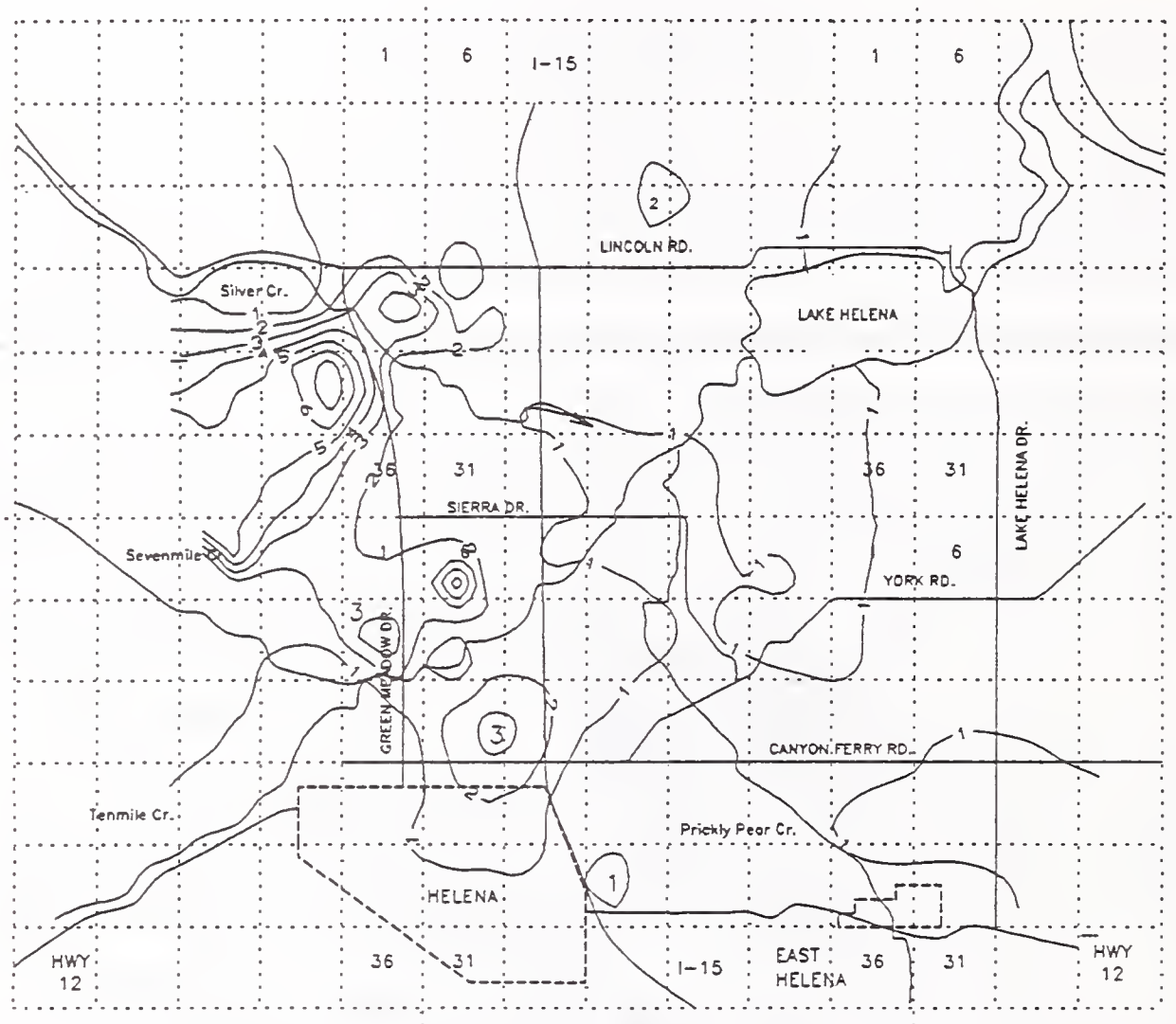


FIGURE 13. 1994 Helena Valley Aquifer Nitrate Concentrations

Figures 14 and 15 are three dimensional surface representations of the grid data for 1990 and 1994, respectively. Each horizontal contour on these "surface" plots represents a 0.1 mg/l increment in nitrate concentration. Topographically, the plots present an aspect of 60 degrees above the horizon and a view across the Helena Valley to the northwest as if looking over East Helena toward Silver Creek and Lincoln Road.

INFRACON '96

By Linda Reed, Governor's Office

As part of our effort to prepare Montana to enter the next century able to compete and succeed, we are undertaking a number of activities to strengthen our business environment so that the private sector will be willing to invest in our State. We are focused on creating conditions where private businesses can succeed, because we believe that they are the engines that drive job creation and economic prosperity.

This focus causes us to work on making our tax system more equitable, insuring that our educational system is meeting the needs of businesses, strengthening partnerships between our universities and private businesses for new product development, finding ways to transfer new technologies from the public sector to private enterprises, and finding ways for it to be easier to be an employer.

Simultaneously, it is important that we insure that Montana, as a State, and individual communities, remains a place where individuals want to live and businesses can operate efficiently. Fundamentally, this means making sure we have infrastructure systems that provide reliable, predictably priced services. I'm sure the readers of the Big Sky Clear Water understand the importance of infrastructure to community vitality, recognize the deficiencies in many of our public systems, and acknowledge the difficulties faced in upgrading and expanding these systems. But the work must be done - and in many communities it is being done.

The State plays an important role in the development of community infrastructure though financing programs and technical assistance. But we can do more and we are by hosting a conference on community infrastructure where we can learn from each other, from our local successes. **The Governor's Conference on Community Infrastructure (affectionately called INFRACON '96)** will be held **May 8, 9, and 10 in Billings**. During this time, we will be able to exchange information that will help us think about old problems in new ways so infrastructure projects can be completed.

I hope you will consider attending the conference. Not only will you learn something, but I think we'll have some fun. **If you have questions, please call Linda Reed at 406-444-5504.**

☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼☼

AMERICAN WATER WORKS ASSOCIATION

INDIVIDUAL MEMBERSHIP APPLICATION

Complete this form, detach and mail to:
AWWA / 6666 W. Quincy Avenue / Denver, CO 80235 / (303) 794-7711

AWWA USE ONLY

PLEASE PRINT OR TYPE

Last Name _____ First Name (and middle initial) _____

Mailing Address _____

_____

City _____ State/Province _____ Zip/Postal Code _____

Area Code _____ Telephone _____ Area Code _____ Fax _____

Title _____

Employer's Name (if not already in mailing address) _____

Applicant Signature _____ Date _____

Signature of AWWA Member Endorsing Application (Optional) _____ Endorser Member Number _____

ANNUAL DUES: **$65 / Active** Grade Code 02 — **$30 / Affiliate** Grade Code 06 (For operator level personnel or employees of small utilities. Will not receive Journal AWWA.) — **$22 / Student** Grade Code 14

ANNUAL DUES $ _____

New England Assessment* _____

Multi-Section Option (other than own) _____

TOTAL DUE $ _____

If you have been a member of AWWA before, indicate dates here: _____

Make Check Payable to AWWA (Canadian Funds add 20%)
☐ MasterCard ☐ Visa ☐ Diner's Club
☐ American Express ☐ Send invoice

Card Number _____

Expiration Date _____

PREPAYMENT OF ONE YEAR'S DUES REQUIRED
No action can be taken on this application until payment is received

*IMPORTANT
Applicants with an address in the New England Water Works Association a Section of AWWA (ME, NH, RI, VT, MA) must add $32.00 for Active Membership, or $15.00 for Affiliate Membership in the annual dues
Address shown above is
Check one. _____ Home _____ Office

ALL APPLICANTS SHOULD COMPLETE THIS SECTION:

Circle the descriptions below that best describe you. The information is used in audits of AWWA readership. Circle only ONE in each group.

BUSINESS AND INDUSTRY

A. Public Water Supply Utility – Municipally Owned
B. Public Water Supply Utility – Investor Owned
C. Governmental – Federal, State, Local
D. Consultant
E. Contractor
F. Private Industrial Systems or Water Wholesaler
G. Manufacturer of Equipment & Supplies including Representatives
H. Distributors of Equipment & Supplies including Representatives
I. Educational Institutions, Faculty and Students, Libraries, and Other Related Organizations
J. Fully Retired
K. Research Labs
L. Unreported

JOB TITLE

A. Executive-Gen'l Mgr., Commissioner, Board Member, City Mgr., Mayor, President, Vice President, Owner, Partner, Director, etc.
B. Management-Division Head, Section Head, Mgr., Chief Engineer, Comptroller, etc.
C. Engineering/non-managerial-Civil Engr., Mech. Engr., Envir. Engr., Planning Mgr., Field Engr., Systems Designer, etc.
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E. Purchasing-Purchasing Agent, Procurement Specialist, Buyer, etc.
F. Operations-Foreman, Operator, Maintenance, Crewman, Service Rep., etc.
G. Marketing & Sales/non-managerial-Mkt. Analyst, Mkt. Rep., Salesman, Sales Rep., etc.
H. Other (describe) _____

CHECK FIELD(S) SERVED

5 ☐ Water Supply Only
7 ☐ Wastewater Only
9 ☐ Both
3 ☐ Other

In some AWWA sections, a portion of the section allotment equal to 50 percent or more of the domestic subscription rate charged for the section periodical will be allocated toward a subscription of that periodical.

Dues allocated for each publication members receive:

Journal $28
Mainstream $6
OpFlow $5

MULTI-SECTION MEMBERSHIP

At this time you may also select a year's membership in other AWWA sections by circling your choices and include $12.00 for each section circled. Enter this total on line reading "multi-section."

CHOICES	SECTIONS
AKA	ALASKA
ALA	ALABAMA MISSISSIPPI
ARI	ARIZONA
ATC	ATLANTIC CANADA (NB, NF, NS, PEI)
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CAL	CALIFORNIA-NEVADA
CHS	CHESAPEAKE (DE, DC, MD)
CON	CONNECTICUT
FLA	FLORIDA
GEO	GEORGIA
HWI	HAWAII (GUAM)
ILL	ILLINOIS
IND	INDIANA
INT	INTERMOUNTAIN (UT, PART OF ID)
IWA	IOWA
KAN	KANSAS
KNT	KENTUCKY-TENNESSEE
MEX	MEXICO
MIC	MICHIGAN
MIN	MINNESOTA
MOU	MISSOURI
MTN	MONTANA
NDK	NORTH DAKOTA
NEB	NEBRASKA
NEW*	NEW ENGLAND (ME, NH, RI, VT, MA)
NEJ	NEW JERSEY
NEY	NEW YORK
NOC	NORTH CAROLINA
OHO	OHIO
ONT	ONTARIO
PAC	PACIFIC NORTHWEST (OR, WA, PART OF ID)
PEN	PENNSYLVANIA
PRT	PUERTO RICO
QUE	QUEBEC
RMT	ROCKY MOUNTAIN (CO, NM, WY)
SCR	SOUTH CAROLINA
SDK	SOUTH DAKOTA
SOW	SOUTHWEST (AR, LA, OK)
TEX	TEXAS
VIR	VIRGINIA
WEC	WESTERN CANADA (AB, MB, NT, SK)
WEV	WEST VIRGINIA
WIS	WISCONSIN

*IF "NEW" ENGLAND IS A CHOICE, add $41.00. This includes their assessment and multi-section fee.

☐ Please send an AWWA membership certificate.

1-1-91

1996 ANNUAL CONFERENCE
MSAWWA & MWEA
"Montana's Waters: the Key to Montana's Future"
May 1 - 3, 1996

Village Red Lion - Missoula, MT

REGISTRATION

Admission to all meetings will be by registration badge only. Make sure you register so you can attend all meetings.

PRECONFERENCE SEMINAR - May 1 $75

"Membrane Technology in Water Treatment"

8:15 a.m. - 9:00 a.m.	Registration and Coffee
9:00 a.m. - 12:00 p.m.	Presentation
12:00 p.m. - 1:00 p.m.	Lunch (included in fee)
1:00 p.m. - 4:00 p.m.	Presentation

CONFERENCE - May 2 - 3

Wed.:	4:00 p.m. - 6:00 p.m.	Registration
	7:00 p.m. - 9:00 p.m.	Meet & Greet
Thurs:	7:00 p.m. - 8:30 a.m.	Registration
	8:30 a.m. - 5:00 p.m.	Presentations
	5:30 p.m. - 7:00 p.m.	Vendor's Hospitality Event
	7:00 p.m.	Banquet & Entertainment
Friday:	8:00 a.m. - 8:30 a.m.	Registration
	8:30 a.m. - 1:00 p.m.	Presentations

Member, General Registration: Member # _____ $100 ☐
Includes two luncheons, banquet, and entertainment

Non-Member General Registration: $110 ☐
Includes two luncheons, banquet, and entertainment

Spouse's Registration: $30 ☐
☐ *Will attend continental breakfast, luncheon, banquet and entertainment.*
☐ *Will attend banquet only.* ☐ *Will attend luncheon only.*

Life Member Registration: $60 ☐
Includes 2 luncheons, banquet, and entertainment

One Day Registration:
Member #_____ $70 ☐
Non-Member $80 ☐
Includes one luncheon

Student Rate: $25 ☐
Does not include meals.

Additional Luncheon Tickets:
Please indicate number _____ @ $15 = $____ ☐
Thursday _____ *Friday* _____

Additional Banquet Tickets:
Includes banquet and entertainment.
Please indicate number: _____ @ $30 = $____ ☐

PLEASE CHECK AMOUNTS INCLUDED

TOTAL AMOUNT OF CHECK FORWARDED: $____ ☐
BILL ME: $____ ☐

If you have guests, please register them and obtain tickets.

CONTINUING EDUCATION CREDIT

Continuing education credits are offered for attendance at the conference. See envelope in registration packet.

.55 CEC's Pre-Conference; .70 CEC's Conference

Non-Members joining now, please enclose completed membership application and one year's dues; then register as a member.

ALL REGISTRATIONS POSTMARKED BY MARCH 29th, 1996 WILL BE ELIGIBLE FOR AN EARLY BIRD GRAND PRIZE DRAWING!!

☐ Check if interested in playing golf Wednesday, May 1, 1996. Tee time 4:00 pm

To assist with catering arrangements, please check if you know you will not be attending the:

☐ Banquet ☐ Thursday Luncheon ☐ Friday Luncheon

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MSAWWA/MWEA and mail it with the following information to:

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P.O. Box 642
Helena, Montana 59624
Phone (406) 443-7531 Fax (406) 443-2439

Name: _____
(Last) (First) (Initial)

Title: _____

Organization: _____

Mailing Address: _____

_____
(City) (State) (Zip Code)

Phone: _____ **Fax:** _____

Spouse/Guest Name (if attending): _____

1996 MWEA/MSAWWA ANNUAL CONFERENCE

"Montana's Waters: the KEY to Montana's Future"

Plan to attend the Annual Joint Conference of the Montana Water Environment Association (MWEA) and the Montana Section of the American Water Works Association (MSAWWA) in Missoula in May this year. Along with another great technical program and pre-conference seminar, the manufacturer's exhibits are sure to surpass those of the past. Every year, it seems, there are amazing new technologies and products that serve to help us do the work of water treatment and environmental protection. The conference promises to be one of the premier events in Montana this year for learning new ideas, catching up with old friends, and making plans to improve Montana's future through water quality improvement and protection.

WEF PRESIDENT TO ATTEND CONFERENCE!!

Dr. Richard Kuchenrither from the Missouri headquarters of Black & Veatch, the president of the Water Environment Federation (WEF), is planning to attend this year's conference in Missoula. Dr. Kuchenrither is a nationally renowned expert in residuals management and has provided key testimony on behalf of WEF to Congress on the Clean Water Act reauthorization. I'm sure he will have some salient remarks to make to the conference concerning these and other issues of national and state importance.

AWWA VICE-PRESIDENT COMING TO JOINT CONFERENCE

Mr. Roderick Holme, Vice-President of Proctor and Redfern, Toronto, and American Water Works Association Vice-President, is scheduled to attend the Joint conference in Missoula in May. Mr. Holme is an engineer formerly from Australia (Sidney), and brings an international flavor to our conference this year. He serves on several AWWA committees, and is active in Canada in establishing standards for piping, filtration and fittings. I suspect that mary Allen, also once an Aussie, and Mr. Holme will have some notes to compare about the Land Down-Under.

MWEA/MSAWWA MEMBERSHIP DRIVES!!!

Both of these highly regarded professional organizations whose memberships are made up of some of the swellest folks you'll ever meet are sponsoring membership drives this year in an attempt to bring more of you high-quality water professionals into our ranks.

Dan Fraser has graciously agreed to serve as membership chair for both groups. He feels strongly that there are great benefits to belonging to both groups. Regardless, though, you should try to recruit your associates to join us, both for the improvement of these fine associations as well as the possibility of winning grand prizes. Dan has yet to identify exactly what the prizes will be, but we will be awarding them to some lucky, yet diligent recruiters at the Joint Annual Conference of MWEA and MSAWWA in Missoula in May.

The rules for winning the prizes are pretty simple. For every new member you sign up, one chance with your name goes into the hat (or other appropriate container). The first name drawn will get the grand prize, the second name the next prize, and so on. One prize per winner. (PSST! I have it on good authority that the prizes will likely be a color TV, a 35mm camera, a personal stereo or the like.)

Don't just stand there!, SIGN somebody up. Bring your friends to the conference. That way, we all get to have more fun and get to make more new friends in our profession.

PRE-CONFERENCE FOCUSSES ON MEMBRANE TECHNOLOGY

The MSAWWA/MWEA pre-conference workshop on May 1st will focus on a treatment technique which is gaining popularity each year -- membrane filtration. The use of membranes in treatment of water -- both drinking water and waste water -- is being touted as the answer to some of today's most difficult treatment problems -- removal of dissolved solids, *Giardia & Cryptosporidium,* organic materials (including disinfectant by-products), and low levels of particles. Terms like reverse osmosis (RO), electrodialysis reversal (EDR), microfiltration (MF), ultrafiltration (UF), and a nanofiltration (NF) are appearing in AWWA publications on a monthly basis.

The pre-conference session will help you catch up on this water treatment trend. The session will feature a number of nationally - recognized speakers, including representatives of membrane and equipment manufacturers as well as design engineers. Speakers will provide practical facts on the basics of membrane filtration, along with some case studies of treatment plants designed for Montana and nearby states. These sessions should be of interest not only to consultants, but to all utility personnel who may be facing some tough treatment problems over the next few years.

Put this date on you calendar. More specific information will soon be available. If you have questions, contact on of the pre-conference co-chairmen -- Dean Chaussee (406) 443-5388 or Doug Whitney, MSE-HKM, Inc. (406) 656-6399.

1996 MWEA/MSAWWA ANNUAL CONFERENCE
"MONTANA'S WATERS: THE KEY TO MONTANA'S FUTURE"
MAY 1-3
MISSOULA, MONTANA

****

WEDNESDAY, MAY 1, 1996

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1996 PRECONFERENCE SEMINAR
"MEMBRANE TECHNOLOGY IN WATER TREATMENT"

8:00 AM	**REGISTRATION**
8:30 AM	**INTRODUCTION TO MEMBRANES**
	WATER SOURCE CONSIDERATION
	PRE-TREATMENT
12:30 PM	**LUNCH (INCLUDED)**
1:30 PM	**REVERSE OSMOSIS TREATMENT**
	POST TREATMENT
	CASE STUDIES
4:30 PM	**END OF SEMINAR**

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THURSDAY, MAY 2, 1996

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OPENING JOINT SESSIONS

8:30 AM	**"The Importance of Water in Montana's Developing Economy"; Mayor Dan Kemmis, City of Missoula**
9:00 AM	**"An Economic Point/Counterpoint Summit on the Economic Value of Water in Montana"; Tom Powers and Paul Polzin, UM, Missoula**
10:00 AM	**VENDOR SHOW**
11:30 AM	**LUNCH**

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1:00 PM	**TECHNICAL PROGRAM - CONCURRENT SESSIONS**

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1:00 - 3:30 PM	**RESEARCH AND SPECIAL TOPICS**
1:00 PM	**"Virus Transport Study in Missoula's Aquifer"; Dan DeBorde, UM, Missoula (PROPOSED)**
1:30 PM	**"Missoula's Household and Small Quantity Generator Hazardous Waste Collection Program"; Shannon Therriault, Co. Health Dept., Missoula**
2:00 PM	**BREAK**
2:30 PM	**"Demonstration Project of an On-site Treatment System"; Max Weiss/BioSeptic, Missoula (Proposed)**
3:00 PM	**"Missoula Water Quality District: Innovative Local Water Quality Management"; Peter Nielsen/Co. Health Dept., Missoula**
3:30 PM	**BREAK**

4:00 - 5:00 PM	**PUBLIC EDUCATION**
4:00 PM	**"Watershed Festival"; Kristi Kline, City of Havre**
4:30 PM	**"Watershed Festival" (continued)**
5:00 PM	**END OF SESSIONS**

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1:00 - 5:00 PM	**PUBLIC WATER SUPPLY ISSUES**
1:00 PM	**"State of the Art Water Metering, Recording and Billing Methods"; Rick Kerin/K&A, Bozeman**
1:30 PM	**"Natural Organic Matter Characterization and Treatability"; Steve Reiber/HDR, Missoula**
2:00 PM	**BREAK**
2:30 PM	**"Low Cost Alternatives for CT Compliance"; Dorothy Bradley with V. Thurston, D. Goodman, R. Stromberg, B. Enright,MSU Water Resources Center, Bozeman**
3:00 PM	**"Introductions and Applications of Membrane Separation Technology"; Douglas Whitney/MSE-HKM**
3:30 PM	**BREAK**
4:00 PM	**"Municipal Water Conservation Potential for Montana"; Gretchen Rupp, MSU Ext. St., Bozeman**
4:30 PM	**"The Pitting Corrosion of Copper"; Steve Reiber/HDR, Missoula (Optional)**
5:00 PM	**END OF SESSIONS**

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1:00 - 5:00 PM	**WASTEWATER TREATMENT ISSUES**
1:00 PM	**"Ultraviolet Wastewater Disinfection in the Intermountain Area"; Cyndy Bratz/MtgmryWatson, Boise, ID**
1:30 PM	**"Pilot Studies of Design Standards for UV Disinfection and Options"; Pat Burke/MtgmryWatson, Seattle, WA**
2:00 PM	**BREAK**
2:30 PM	**"Submerged Bed Wetlands for Lagoon Effluent: Polishing in a Cold Weather Climate"; Tom Loder/Hydrometrics & Dan Harmon/HDR, Missoula**
3:00 PM	**"Meeting the Nation's Toughest Nutrient Standards"; Bruce Willey/HDR, Lake Oswego, OR**
3:30 PM	**BREAK**
4:00 PM	**"Chlorine Use in Secondary Clarifiers for Algae Control"; Starr Sullivan, Missoula WWTP, Missoula**
4:30 PM	**"Use of Selector Basins for Activated Sludge Control & Biological Nutrient Removal"; Starr Sullivan, Missoula WWTP, Missoula (Optional)**
5:00 PM	**END OF SESSIONS**

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FRIDAY, MAY 3, 1996

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8:30 AM	**TECHNICAL PROGRAM - CONCURRENT SESSIONS**

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8:30 - 10:00 AM	**GROUND WATER/WATERSHED ISSUES**
8:30 AM	**"Remediation of Mercury Impacted Soils as Gas Metering Sites in Montana"; Michael Larson/MPC, Butte**
9:00 AM	**"Development of a Voluntary Strategy to Control Nutrient Pollution in the Clark Fork River Basin"; Gary Ingman/WQD, Helena**
9:30 AM	**"Evaluation of High Density Unsewered Areas in Missoula Montana"; Alan English/Co. Health Dept., Missoula**
10:00 AM	**END OF SESSIONS**

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8:30 - 10:00 AM	**MANAGEMENT ISSUES**
8:30 AM	**"Finance Options for Infrastructure"; Barb Neuwerth/WQD, Helena (Proposed)**
9:00 AM	**"Energy Efficiency Study for the Mountain Water Company in Missoula Montana"; Dr. Blaine T. Reely/Envirotech Services, Enid, OK**
9:30 AM	**"An Alternative for Water Suppliers/Bridge Maintenance Departments Coping with Lead Paint Removal Regulations"; Rick DaSilva/DaSilva Coatings, Farmingville, NY**
10:00 AM	**END OF SESSIONS**

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8:30 - 10:00 AM	**COLLECTION/DISTRIBUTION SYSTEMS**
8:30 AM	**"No-Dig Technology"; Erling Tufte/MMSE, Billings (Proposed)**
9:00 AM	**"Water Line Rehab: The Polson Experience"; John Campbell/Pub. Works Dept., Polson**
9:30 AM	**OPEN**
10:00 AM	**END OF SESSIONS**

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10:00 AM	**BREAK**

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CLOSING JOINT SESSION

10:30 AM	**"Capital Improvement Needs of Small Systems: Experiences in 15 States and American Samoa"; Dan Fraser, Helena**
11:30 AM	**END OF TECHNICAL PROGRAM**

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MEMBERSHIP APPLICATION - WEF 1996

1

First Name _____ M.I. _____ Last Name _____ (Jr., Sr., etc.) _____

❑ Check here if renewing

Current WEF ID Number _____

❑ Business Address ❑ Home Address

Business Name (if applicable) _____

Street or P.O. Box _____

City _____ State _____ Zip _____ Country _____

Home Phone # _____ Business Phone # _____ FAX# (if applicable) _____

Association Choice (See reverse side for selections) M O N T A N A

2

Please call WEF at 1-800-666-0206 for CODES information.

Employer Code __/__ **Other** (please specify)_____ **Job Title Code** __/__ **Other** (please specify) _____

Environmental Focus __/__; __/__; __/__; __/__; __/__; __/__; **Other** (please specify) _____

3

WEF Sponsor Name (optional) _____ Sponsor I.D. Number _____

Source Code for WEF use only __/__/__

4

MEMBERSHIP CATEGORIES: Select one only. Are you retired? Call the WEF Member Services Center at 1-800-666-0206 to find out about our retirement membership category.	**COMPLIMENTARY PUBLICATION** Select One — NOTE: "★" subscriptions are already included with membership	**DUES** (Montana)
❑ Active For individuals involved or interested in the advancement of knowledge pertaining to water quality.	❑ ***WE&T*** ❑ ***Water Environment Research*** ❑ ***Industrial Wastewater*** ✔ ***Highlights**** (included)	$ **($82.00)**
❑ Operations Division **Type of Membership:** ❑ Individual ❑ Organization/Agency† For individuals working in, or responsible for, the operation of one or more wastewater collection, treatment or laboratory facility, or for facilities with a daily flow of < 1 mgd or 40 L/sec.	❑ ***Operations Forum*** ❑ ***Water Environment Laboratory Solutions*** ✔ ***Highlights**** (included)	$ **($46.00)**
❑ Student For individuals enrolled at least half-time in a college or university. A photocopy of current student ID is required.	❑ ***WE&T*** ❑ ***Water Environment Research*** ❑ ***Operations Forum*** ❑ ***Industrial Wastewater*** ✔ ***Highlights**** (included)	$ **($22.00)**
❑ Corporate Corporations engaged in the design, construction, operation or management of water quality systems. **One person is entitled to receive Membership benefits.**	✔ ***WE&T**** (included) ✔ ***Water Environment Research**** (included) ✔ ***Industrial Wastewater**** (included) ✔ ***Operations Forum**** (included) ✔ ***Highlights**** (included) ✔ ***Water Environment Regulation Watch**** (included) ✔ ***Biosolids Technical Bulletin*** (included)	$ **($180.00)**

5 ❑ **Dual Membership** If you would like to join more than one Member Association. please indicate which association(s) you would like to join. **Call WEF at 1-800-666-0206 for dues information.**
WEF will track no more than three additional associations. Dual Association(s)_____ $ **(Varies)**

6 ❑ **Additional Subscriptions**
You may ADD one or more subscriptions to your membership package if they are not already included. Check the appropriate subscription and the corresponding subscription cost.

❑ ***Water Environment & Technology***	❑ ***$ 40.00***
❑ ***Water Environment Research***	❑ ***$ 40.00***
❑ ***Industrial Wastewater***	❑ ***$ 40.00***
❑ ***Operations Forum***	❑ ***$ 25.00***
❑ ***Water Environment Laboratory Solutions***	❑ ***$ 35.00***
❑ ***Water Environment Regulation Watch***	❑ ***$ 35.00***
❑ ***Biosolids Technical Bulletin*** (avail. 7/1/95)	❑ ***$ 89.00***

TOTAL $

7 **METHOD OF PAYMENT** ❑ **Check enclosed** (made payable to WEF)
Charge: ❑ Visa ❑ American Express ❑ MasterCard

Credit Card Number_____ Exp. Date _____ Signature _____

8 **SEND FORM & PAYMENT TO:** Water Environment Federation • Financial Management • 601 Wythe Street, Alexandria, Va 22314-1994
For more information, call 1-800-666-0206, or if outside U.S. and Canada, call 1-703-684-2452 • FAX: 1-703-684-2492

† One person is entitled to receive membership benefits

Postage Requirement Dues allocated for publications when included in membership WE&T–$40. Water Environment Research–$40. Industrial Wastewater–$40. Federation Highlights–$15; Operations Forum–$25. Water Environment Regulation Watch–$35 Water Environment Laboratory Solutions–$35. Biosolids Technical Bulletin–$89.

ANNUAL MWEA BIOSOLIDS AWARD

The Montana Water Environment Association (MWEA) - Biosolids Committee announces that it will be presenting an award at the annual MWEA conference. The award will be given to the community or private facility which epitomizes the following goals and objectives of the Biosolids Committee:

1. *Beneficial Reuse* - Biosolids program must include utilization of biosolids for land application, composting, land reclamation, etc., instead of landfilling, or surface disposal alternatives.

2. *Compliant with 40 CFR Part 503* - Biosolids reuse practices must meet all applicable requirements of the Standards for Use and Disposal of Sewage Sludge (40 CFR Part 503).

3. *Marketing & Education* - Biosolids program contains efforts at marketing biosolids and/or efforts to educate public about biosolids reuse.

4. *Long-Range Planning* - Biosolids program has considered ways of assuring that reuse alternatives will remain viable in the future, and/or ways of increasing the reuse alternatives available.

5. *Quality Control* - Biosolids program includes methods of assuring that reused biosolids are of good quality.

The MWEA Biosolids Committee welcomes any nominations (including self-nominations) for this award. To make a nomination, please submit a letter describing how the nominee satisfies as many of the above criteria as are applicable. The letter should be no longer than 2 pages, and must be submitted before March 15, 1996 to Mr. Paul LaVigne - Chairman of the MWEA Biosolids Committee, at the following address:

MDEQ/WQD
P.O. Box 200901
Helena, Montana 59620-0901

Any questions on how to make nominations, or to clarify the criteria should directed to Mr. LaVigne at 444-5321.

MWEA Presidents Message

by Mike Rubich

I hope this message finds you all enjoying the New Year! Like the recent past, 1996 is shaping up to be a time of continued uncertainty and challenge for all involved in our industry. In the face of these challenges, I can happily report that your association has entered the new year with some growth in our total membership and on a sound financial footing.

While the association's continued existence seems to be secure for the time being, our ability to make a difference in these changing times depends upon stewardship by individual members. I am positive that our organization will be much stronger and more meaningful with small individual efforts by many of our members rather than relying on a few to do everything. As a result I would ask that each member to look for some way to actively support the organization. Your efforts could consist of urging your fellow workers to become members, participation on a committee, or support to one of the several professional and educational events we sponsor every year. Any help you can produce is meaningful.

Plan now to attend our joint conference with MSAWWA in Missoula. The host city and program committees are putting together an event that all will enjoy. This year's theme is "Montana Waters: The Key to Montana's Future". Technical papers have been solicited and a substantial response has been received for a variety of interesting topics. The conference is an event well worth your time and expense.

Every other year the association sponsors infrastructure funding workshops jointly with the Montana Department of Commerce and the Montana Department of Natural Resources. These workshops are timed to coincide with the application periods for grant and loan programs administered by these agencies. This year the workshops will be held at Billings and Missoula on March 6-7 and March 20-21, respectively. These workshops are helpful in successfully obtaining funding for community infrastructure. Plan on attending one of the sessions if you can.

As a final note, do you still have your membership directory? If you do you have probably noted how out of date it has become. You'll be able to replace that directory with a new one before too long. New directories are being published in a joint effort with MSAWWA. You'll notice some changes in the format. We have sold advertising this year, a venture that has been very successful and offset a substantial portion of the costs to both associations. When you contact one of the advertisers for products or services let them know you saw their advertisement in our directory.

I consider it an honor to have served as president over the last year and look forward to seeing you at the conference.

Information Meetings

Montana consulting engineers and project managers are invited to register now to attend information meetings on funding available to small rural Montana communities for water and wastewater system improvements. The U.S. Department of Agriculture's Montana Rural Economic and Community Development (RECD) will hold two statewide information meetings on its Water and Waste Program.

The four-hour meetings will be held in Billings on March 5 and in Missoula on March 19 to explain the Rural Utilities Service Program, including:

- Current funding levels - grants and loans
- Application process and obligation of funds
- Agreement for engineering services
- Engineering requirements: design and construction

There is no registration fee, but attendance is limited. Register in advance by calling RECD at (406) 585-2520, or FAX (406) 585-2565.

Mountain Water Company Joins AWWA Research Foundation

Mountain Water company became the first water system in Montana to join the AWWA Research Foundation. Mountain Water operates systems in Missoula and Superior that serve about 50,000 people. The Research Foundation has about 800 utility members primarily in the US and Canada and which serve 142 million people. The Research Foundation mission is "to advance the science of water to improve the quality of life." Member dues are used to conduct research into all aspects of water supply planning and operation. Much of the research is done in conjunction the EPA or to acquire information needed for setting standards for the Safe Drinking Water Act. The research is becoming more critical as EPA's budget for research shrinks due to the budget problems. Other research areas includes treatment plant optimization and distribution system maintenance.

Mountain Water joined the Research Foundation because the company believes that being part of and contributing to water related research is a benefit to both the company and its customers. Information acquired can be used for long term planning as well as improvements in current practices. Some changes made due to information provided to Research Foundation include an improved system flushing program and an evaluation of our meter purchasing and change out program

For more information of the Research Foundation, contact them at 1-303-794-7711.

Scott Anderson Leaves Water Quality Division

After 17 well-served years, Scott Anderson has left the Municipal Wastewater Assistance Program, of which he was program manager. Scott managed the Construction Grants and State Revolving Fund (SRF) programs. In fact, he was the principle driving force in developing and implementing the SRF program in Montana, and is arguably one of the state's leading authorities in wastewater facility planning, design, operation and financing. Scott's forward-thinking attitude and his commitment to water quality protection were significant factors in the creation and development of the Montana Environmental Training Center. Scott has been and continues to be actively involved in the Montana Water Environment Association where he has held various offices, including president and director. Scott recently received the prestigious Bedell award from the Water Environment Federation which recognizes outstanding achievement in water pollution control.

Maybe more importantly, Scott received the famous Golden Toilet Award, which recognizes outstanding personal achievement in the dirty water world. This prestigious award is only bestowed upon those with irreproachable character. In his time with the Municipal Wastewater Assistance Program, Scott has continually shown poise under pressure and humor in the midst of chaos. He has been a tremendous leader by example. His integrity, professionalism, and dedication have been impeccable.

Scott will continue to be involved in water pollution control in his new position as a senior engineer with Neil Consultants, Inc. in Helena. Good luck, Scott!

Pat Burke Will Be Missed

Pat Burke left his position at the Water Quality Division as the Pollution Prevention (P2) Coordinator for municipal Wastewater facilities. Pat went back into the consulting world in Seattle. During his short time with us (a year and a half), Pat did an incredible amount of work. But in addition to his productivity, there were other attributes that Pat gave to his fellow workers. His commitment toward excellence, his high energy level, his professionalism, his expertise in wastewater treatment design, and his sense of humor benefitted all of us who worked with Pat. He will be missed. Good luck and thanks, Pat.

MWEA DIRECTOR'S MESSAGE

by Bill Bahr

I finally attended my first Water Environment Federation annual convention. The weather can feel really hot in Miami, but we were blessed with daily afternoon deluges that, coupled with fairly stiff breezes, kept things from getting too toasty. Not that I was outside much anyway; all those meetings, exhibits and presentations kept getting in the way. I will say, however, the last two afternoons, after the meetings were over, Barry and I managed to lay on the beach and catch some rays.

Now, down to business. The WEF Board of Control, made up of the national directors from all the Member Associations, including the Montana Water Environment Association, voted to raise dues for the Active and PWOD memberships. The Active members will now pay $82.00 per year and the PWOD members will pay $46.00 per year. That's an increase of $12.00 and $6.00 respectively. MWEA will still only get $10.00 back from WEF per membership, so the entire increase is designed to help WEF deal with increased costs for doing just about everything. The last dues increase was several years ago and inflation has affected WEF, too. There is talk of instituting regular small dues increases rather than an occasional large one like this. Please give me feedback on the preferable option.

A word of note, however. The dues increase was not undertaken or voted in without a great deal of serious consideration. I spoke in opposition to it based on concerns I have about losing membership, especially in the PWOD ranks, and I'm not entirely convinced that all possible organizational efficiencies have been implemented. On the other hand, I do not think that WEF annual dues are exorbitant. The professional and personal benefits possible from being actively involved with MWEA and WEF are many and varied.

I have attended several educational programs that have been beneficial to me in my profession. Several of my best friends have come from the ranks of the MWEA and WEF. The work being done statewide and nationally by these organizations is of immeasurable value to our environment, water, and people. Those who participate in the committees that make up the Montana Water Environment Association gain leadership skills, management training, and learn to work with other professionals as part of a team.

In case you haven't read any of the fine WEF journals or used any of the WEF Manuals of Practice, you are missing top notch material. WEF has been in the forefront of protecting water resources from pollution for decades, and continues to lead the way. Our own group, the MWEA, publishes the **CLEARWATER** twice a year. Your memberships will get you reduced prices from WEF for their books. Your dues include a WEF journal. The **CLEARWATER** is yours for being a part of our group, and you get a reduced price to attend the **Joint Annual Conference.**

If you haven't fully decided to join one of MWEA's committees, please contact one of the MWEA officers for more information at the annual conference. The **Joint Annual Conference** is scheduled for May 1-3, 1996, in Missoula. You should plan to attend. The presentations will be exciting and educational, and you can look up some of your old friends or make new ones at the social functions planned during the conference. The vendor exhibits are always filled with new and interesting equipment, and prizes will be given away!

The MWEA Education committee has two Infrastructure Financing workshops planned this year, the Biosolids committee is planning some activities, including a display booth at the conference, and the Public Education committee is involved with Water Festival activities again this year.

This year, MWEA will honor an operator, supervisor or manager of a wastewater treatment plant with **the MWEA Operator Award.** I believe we also get to award a facility with outstanding safety practices this year, with the **WEF Burke Award.** As always, MWEA will select a small system to present the **MWEA Small System Award** to at the conference.

MWEA selects a college student in Montana to receive a scholarship to help with educational finances. The scholarship is a joint activity with the Montana Section of the American Water Works Association.

Since I belong to the Professional Wastewater Operators Division of WEF, I would like to promote activities for operators in the state. I don't think we'll get a team to the WEFTEC National conference in Dallas this fall, but it's an idea worth shooting for. We could assist the certification officer and the operator training entities in the state by developing information about what our jobs entail. An up-to-date **Operator Need-To-Know List** is critical to the improvement of our profession. I propose we work together to prepare descriptions of all the tasks we perform in carrying out our duties, so basic training can be made more relevant and continued education can provide us with new information about were this field is headed.

Finally, I want to impress upon all members of both MWEA and MSAWWA the importance and value of these two organizations and their national affiliations, WEF and AWWA. Our members are the leaders in their communities and state in providing quality drinking water and wastewater treatment, and in protecting our natural environment. Your involvement means that even more can be accomplished. These are not your "honorary" type groups. These folks roll up their sleeves and get down to it. So, take the time to call one of the officers in your association and ask what you can do for your environment.

Thanks, Bill Bahr.

REQUEST FOR PRE-PROPOSALS -- DRINKING WATER TECHNOLOGIES
The Montana University System Water Center
Drinking Water Assistance Program (DWAP)

DUE DATE: ***March 1, 1996***

WANTED -- pre-proposals from the *private sector* for promising *drinking water technologies*. Suitable technologies will be matched with university expertise for validating, monitoring and/or demonstration.

BACKGROUND

DWAP is a pilot program developed by the Montana Water Center to help respond to three needs:

- ✦ small entrepreneurs and inventors trying to advance experimental drinking water technologies
- ✦ regulators who need unbiased information about new technology reliability
- ✦ small communities and isolated water systems who need safe and affordable drinking water

EXPECTATIONS OF APPLICANTS

1) The process will involve partnership arrangements, generally including private entrepreneurs, university research teams, small communities or water systems, and government regulators.
2) ***The DWAP grants will only fund the involvement of the university community. Grants will not fund the participation or investments of the entrepreneur, water system, etc.***
3) Projects generally involve one to one-and-a-half years of work, particularly if climatic conditions are part of the study. The starting date may be as early as June 1, 1996.
4) Government regulators are included as partners, to ensure that their information needs are met.
5) Proprietary information is respected, and issues of confidentiality will be covered in a Memorandum of Understanding.
6) Preference will be given to those pre-proposals that,
   - ✦ have significant implications for the northwest region of the country
   - ✦ are cost effective
   - ✦ have a positive impact on drinking water challenges faced by small communities
7) Screening will involve Water Centers from WINSM states (Wyoming, Idaho, North and South Dakota, and Montana), and peer review by university experts. The final selection will be made by the Montana Water Center.
8) *Successful applicants will be required to submit a full proposal.*

PRE-PROPOSAL GUIDELINES

1) Pre-proposals must include and originate from a private sector entity or a small water system with a base in a WINSM state. Clearly identify name, address, phone and fax number of principal contact.
2) Pre-proposals should be no more than *two pages*, and in the following format:
   a) discuss the nature and status of the technology
   b) describe the problem the technology addresses
   c) identify the barriers to the advancement of the technology
   d) describe general areas of university expertise that would be beneficial
   e) discuss the nature of the investigation
   f) identify other appropriate partners/facilities in the investigation; e.g., small communities, residential dwellings, particular parts of drinking water systems, laboratory facilities, etc.
3) Letters of support are encouraged. Please send them along with your pre-proposal.
4) ***DUE DATE -- MARCH 1, 1996***
5) *Submit five (5) copies to:* Montana Water Center
   101 Huffman Building
   Montana State University
   Bozeman, MT 59717
   Attention: *TECHNOLOGY PREPROPOSAL*

Phone: (406)994-6690

GRANT PROPOSAL WRITING SEMINAR SLATED FOR MARCH

By Jan Boyle, METC

Small community water and wastewater system managers and other public infrastructure individuals interested in learning about the techniques and the process of developing and writing proposals will want to attend this informative seminar scheduled for **March 26-27, 1996 in Great Falls** at MSU Northern's Great Falls Campus. Montana Environmental Training Center (METC) has invited ***Janet Cornish***, community Development Services of Montana, to instruct this seminar which will focus on the processes involved in identifying those funding sources specific to the community's needs and on those often overlooked steps related to the pre-writing phase of the proposal. The instructor will be facilitating in-class group exercises and examples to emphasize these approaches.

This seminar topic is one many of you in the business of water quality have requested METC sponsor but is not listed in the METC 1996 Training Calendar. The cost of this seminar will be $90.00 for two days and includes registration fees and seminar materials. **Preregistration is necessary!** Please contact **METC at 454-2728** for further information and to register. In an effort to address specific questions those of you may have related to the topic and your needs, please share them with us at the time of preregistration, and we will pass them on to the instructor to facilitate their response during the seminar.

☼☼☼☼☼☼☼☼☼☼☼

STATE CHEMISTRY LABORATORY

JILL F. COHENOUR

As part of the reorganization of state government, the State Chemistry Laboratory has now become part of the Department of Public Health and Human Services (DPHHS). We are still located in the Cogswell Building in the Capitol Complex. As an EPA Region VIII certified environmental laboratory we will continue to assist our customers with state and federal drinking water regulations. In addition to offering a wide range of analytical testing for environmental contaminants, the laboratory also offers technical assistance and consultation services to our clients. Due to recent departmental changes, we are now able to provide testing for areas of compliance monitoring previously unavailable. We would like to thank the public and all system operators who have used our services in the past and encourage anyone unfamiliar with our analytical capabilities to contact us with any questions.

IF YOU NEED:

- COMPLIANCE MONITORING for Phase II and Phase V Regulations or permitting requirements
- LEGALLY DEFENSIBLE DATA to demonstrate compliance to any third party
- QUALITY ASSURANCE / QUALITY CONTROL with essential documentation
- TECHNICALLY ASTUTE answers to your questions

THE STATE CHEMISTRY LAB OFFERS:

- STATE-OF-THE-ART INSTRUMENTATION for testing
  Drinking Water
  Solid and Hazardous Waste
  Soils
  Petroleum
  Surface Water
  Ground Water
- FAMILIARITY WITH REGULATIONS
- COMPLETE ORGANIC AND INORGANIC TESTING
- DATA TRANSFER CAPABILITIES to other State agencies upon request
- RESOURCE FOR AGENCIES involved in regulation

Call or Fax us with your questions or to get information about our services. We are looking forward to hearing from you soon.

Phone: 406-444-5262 Fax: 406-444-1802

4th Annual Spring Water School

Attn: Water and Wastewater Operators

March 13, 14 & 15, 1996
Lewistown, MT

The 4th Annual Water and Wastewater Operator School will be held in Lewistown, Montana, March 13 - 15, 1996. This seminar will be designed for entry level AND experienced operators and managers. Topics and presentation will specifically target professional growth of the small system operator or manager. It will feature an array of topics from well subjects, distribution systems, lagoons, to process control of water treatment and activated sludge facilities.

Preventive maintenance, safety, and current regulation are other examples of topics to be covered. Basics of surface water treatment, well systems, and distribution operations will be emphasized. Special Operator Study (SOS) classes will be offered during the day for operators taking the certification exam on Saturday, March 16. There will be no CEC's offered for these classes as Operator's In Training are not required to earn them. This school will feature speakers from the Water Quality Division, Local Governments, and the professional community. Advanced operators are asked to attend other seminars, which are provided throughout the year.

CEC's	1.7
Fee	$75.00
Sponsor	METC (454-2728)
Date	March 13 - 15, 1996
Location	Lewistown, MT

WATER AND WASTEWATER OPERATOR CERTIFICATION NEWS

by Shirley Quick, Certification Officer, WQD

WHAT IS THE WATER AND WASTEWATER OPERATORS ADVISORY COUNCIL?

You have probably seen the Water and Wastewater Operators Advisory Council referred to in articles in the Clearwater and in information that I have sent you. What you probably don't know is what the Council does and what its purpose is. The following information should clear up any questions you may have.

Who is on the Council? The Montana Code Annotated (MCA) 2-15-2105 specifies that the council will be made up of seven members appointed by the governor (except the WQD member). The term of each Council member is six years. The Council is composed of the following members:

Two members employed by water supply systems or water treatment plants. One member shall hold a valid Class 1 certificate. This position is held by **Steve Ruhd** who holds a Class 1 certificate in water distribution, water treatment and wastewater. Steve is the public works director for the City of Conrad. He has been on the Council since 1989 and served as chairman from 1993 to 1995. Steve has just been appointed by Governor Racicot to his second term on the Council.

The other water member of the council is **Lee Leivo**. Lee holds certificates for Class 3 in water distribution, Class 2 in water treatment, and Class 2 in wastewater. Lee is the district manager for the Bigfork Water/Sewer District. He has been on the Council since 1992 and is now serving as **Vice Chairman**.

Two members employed by wastewater treatment plants. One shall hold a valid Class 1 certificate. This position is held by **Mike Holzwarth** who is certified in Class 2 water distribution, Class 1 water treatment, and Class 1 wastewater. Mike is the supervisor of municipal services for Colstrip Community Services. Mike has been on the Council since 1990 and was recently elected **Chairman**.

The other wastewater member is **Robert Cottom**. Bob is certified as a Class 1 water distribution and water treatment operator, and a Class 3 wastewater operator. Bob is the assistant director of operations for the City of Dillon. Bob has been a Council member since 1991.

One member serving on the faculty of a university or college whose major field is related to water supply systems, wastewater treatment, chemical or civil engineering, chemistry or bacteriology. This



Council members Warren Jones (left) and Steve Ruhd discuss certification issues at the last fall water school in Bozeman.



Curt Myran (left) and Lee Leivo relax during a break in the September Council meeting held in Bozeman.

position is held by **Warren Jones, Ph.D**. Warren is an assistant professor in the civil engineering department at Montana State University in Bozeman. Warren has been on the Council since 1994 and is the director of the annual fall water school.

One member who is a representative of a municipality required to employ a certified operator and holds a position of either city manager, city engineer, director of public works, works manager or equivalent position. **Curt Myran**, director of public utilities for the City of Miles City, has held that position on the Council since 1994. Curt is also certified as a Class 1 water treatment operator and a Class 2 wastewater treatment operator.

A member of the Department of Environmental Quality staff appointed by the Department Director. Until he left the employment of the state, Scott Anderson was the Department member on the Council. Mark Simonich, DEQ Director, is in the process of appointing a new Department representative.

What does the Council do? MCA 37-42-203 states that the Council "shall advise and assist the department in the administration of the certification program. The Council shall serve as an advisory board to the department in actions relating to the qualifications of water and wastewater treatment plant operators."

The Council is a working council; they help to administer the spring exams held in seven locations around the state and also with the math reviews that are given before each exam. They are also active in certification issues such as the selection of contract workers, review and evaluation of new exams and study materials, and continuing education policy changes.

The Council is also there to listen to your concerns about the certification process.

How can you reach the Council? Your concerns can be heard by the Council by contacting an individual Council member or by writing to them through Shirley Quick at the certification office (P.O. Box 200901, Helena MT 59620).

☞ QUICK REMINDERS ☜

June 30, 1996 is the end of the next two year CEC period - don't forget to earn your CECs by then.

No CECs will be granted for the MRWS math review or spring water school basic track of training since they are designed for applicants for exams, not certified operators.

Applicants for Class 4 & 5 can take their exams February 16, 1996 at the end of the MRWS conference. The deadline for sending in your certification applications is February 1.

It is the law that systems and operators must notify the certification office (406/444-2691) within three business days when the certified operator quits.

MATH REVIEW FOR CERTIFICATION EXAM

Sponsored by

WATER QUALITY DIVISION
March 15, 1996
6:30 - 9:30 pm

BILLINGS
MSU-Billings (EMC)
Student Union Building
Second Floor
Yellowstone Room

HAVRE
MSU-Northern
Hagener Science Center
Room 103-104

HELENA
Cogswell Building
1400 Broadway
Room C209
(Use Broadway entrance)

****KALISPELL**
Kalispell Wastewater Treatment
Plant Conference Room
2001 Airport Road
(south end of city airport)

***LEWISTOWN (AFTERNOON ONLY)**
Yogo Inn
211 E Main Street
Sapphire Room

MILES CITY
Miles Community College
2715 Dickinson, Room 106
(Main building)

MISSOULA
Ruby's Reserve St Inn
4825 N Reserve St
Room 700

♣♣

These sessions are intended to review basic math for those people with valid applications for the exam being given on Saturday, March 16, but attendance is not mandatory. **You will never learn everything you need to know at a water school to pass the exam OR to be a competent operator.** The study materials we provide and suggest are designed for self study. Since these sessions are designed for entry level operators, **no CECs will be given** for any of these sessions, either for the Friday evening sessions or the ones available through MRWS and the Lewistown water school.

*At the March 1996 water school in Lewistown there will be sessions available each day to answer questions you may have from your self study, and to give you an overview of information. Look inside the Spring 1996 issue of the Big Sky Clearwater for more information on the spring water school in Lewistown. **The Friday, March 15 study session will be held in the AFTERNOON only following the water school from 1:30pm to 4:30pm.**

The sessions in Kalispell will be held from March 13 through March 15 and are taught and **sponsored by Montana Rural Water Systems. For more information, contact their office at 406/454-1151.

For more information contact Shirley Quick, Water/Wastewater Certification Office, 444-2691.

CERTIFICATION EXAMINATION NOTICE
SATURDAY, MARCH 16, 1996 9:00 AM to 1:00PM

Examinations for certification as a Water and Wastewater Operator will be given at these seven locations:

BILLINGS	**MSU-Billings (EMC); Student Union; second floor; Yellowstone Room**
HAVRE	**Northern Montana College; Hagener Science Center; Room 103-104**
HELENA	**Cogswell Building; 1400 Broadway; Room C209 (use south side entrance)**
KALISPELL	**Kalispell Wastewater Treatment Plant; 2001 Airport Road; Conference Room (south end of city airport)**
LEWISTOWN*	**Yogo Park Inn; Sapphire Room**
MILES CITY	**Miles Community College; 2715 Dickinson; Room 106 (main building)**
MISSOULA	**Ruby's Reserve Street Inn; 4825 N Reserve Street; Room 700**

*Note: An examination will NOT be given in Great Falls since the Spring Water School is taking place in Lewistown.

NOTE, THERE WILL BE NO EXCEPTIONS TO THIS: By MARCH 1, 1996, as required by ARM 16.18.204, everyone taking examinations must have:

1. completed an application for certification as a water/wastewater operator;
2. paid application (or renewal) fees for fiscal year 96 which ends 6/30/96; and
3. submitted examination registration slips and fees of $5 per examination. (Combination examinations **2A3B, 3A4B, 4A4B and 5A5B require $5 examination fee only**.

APPLICATION FEES ARE:

$30 for water (including either or both water distribution or water treatment)
$30 for wastewater

To request application materials or to ask for additional information, call Shirley Quick at the certification office at 444-2691 or write:

Water/Wastewater Operator Certification
Water Quality Bureau - P.O. Box 200901 - Helena 59620-0901
PLEASE KEEP THE UPPER PORTION OF THIS NOTICE

- -

EXAMINATION REGISTRATION SLIP

(To be registered for exam, detach and return this slip with appropriate fees by March 1, 1996)

I will take the examination(s) I have checked below at:

☐ **Billings** ☐ **Havre** ☐ **Helena** ☐ **Kalispell** ☐ **Great Falls** ☐ **Miles City** ☐ **Missoula**

	1	2	3	4	5
A - Water Distribution	____	____	____	____	____
B - Water Plant	____	____	____	____	____
C - Wastewater Plant	____	____	____	____	

NAME: ______________________ **SYSTEM:** ______________________

ADDRESS: ____

[Objects of revenue: exam 5002, water app (A&B) 5005, wastewater app (C) 5006]

PASSING EXAMINATIONS FOR FULL CERTIFICATION OR OPERATOR-IN-TRAINING (OT) 9/29/95

NAME	CITY	CLASS	NAME	CITY	CLASS
ALGER, Howard L.	Missoula	1C	PETERSON, Russell J.	Missoula	1Cot
ALMON, John W.	Great Falls	1A	RIDER, Greg	Ft Belknap	1Bot
BICHA, Jerry P.	Bonner	1Cot	ROBINSON, John A.	Bozeman	1Aot
JOHNSON, Richard D.	Great Falls	1A	SALISBURY, John A.	E Glacier	1Bot
KONECKY, Curtis B.	Kalispell	1Cot	SMITH, Greg J.	Molt	1C
MONNINGER, Stephen	Jardine	1Bot	SMITH, Ward L.	Wolf Point	1Aot
MURPHY, Mike J.	Butte	1Cot			
BARTEL, Larry A.	Ft Peck	2Bot	LOWRY, Lorin N.	Cut Bank	2A
DAMOUDE, Carl W.	Helena	2Cot	MUSCAT, James P.	Big Sky	2A3Bot
DUCHARME, Lynn S.	Bozeman	2Cot	PECK, Michael C.	Lewistown	2A3Bot
HENSEL, Benjamin D.	Bonner	2Cot	WELCH, John	Philipsburg	2B
LANMAN, Wayne R.	Libby	2Cot			
COCHRAN, George R.	Troy	3A4Bot	MATT, Charles	Pablo	3C
CRAVER, John T.	Libby	3C	MUSCAT, James P.	Big Sky	3Cot
DAMOUDE, Carl W.	Helena	3A4Bot	OTIS, David H.	Corwin Spgs	3A4Bot
DICKEN, Greg R.	Plains	3A4Bot	PETRI, Bruce E.	Plains	3A4Bot 3Cot
FLAGLER, Bernie L.	Manhattan	3A4B	RICHARD, Joseph	Eureka	3A4B 3C
JACOBSEN, Brian L.	Corwin Spgs	3A4Bot	SABOL, Rodney M.	E Helena	3C
KELLY, John P.	Missoula	3A4B	WASSER, Chuck H.	Harlem	3C
LEU, Russell D.	Bozeman	3A4Bot 3Cot	WELCH, John	Philipsburg	3A
BRACE, Edward P.	Neihart	4Aot	KOBY, Robert F.	Bozeman	4AB
BROWN, Gary L.	Cooke City	4A	LEI, Charlie W.	Ashland	4C
BURTCHETT, James E.	Geraldine	4Cot	MANKLE, Richard A.	Billings	4ABot 4Cot
FLAGLER, Bernie L.	Manhattan	4C	MARTIN, Warren	Broadus	4Cot
FOSS, Gary D.	Worden	4AB	MILLER, Richard J.	Worden	4AB
GREENWOOD, Gary	Moore	4ABot	MONNINGER, Stephen	Jardine	4Aot
HADFIELD, Bill	Boulder	4C	RILEY, Michael B.	Melrose	4Cot
HILDRETH, Darlene F.	Dillon	4ABot	SMITH, Robert D.	Cooke City	4A
JOHNSON, Dorothy M.	Circle	4C	WELCH, John	Philipsburg	4C
JONES, Kay L.	Melrose	4Cot	WRIGHTS, Roy R.	Wilsall	4AB
RODOWICZ, Eugene A.	Anaconda	5AB	SPERANDEO, Ronald	Eureka	5AB
SPERANDEO, Florence	Eureka	5AB			



Agricultural Chemicals

Jeanette Rasmussen

Murphy's law of ground water contamination goes something like this whatever can get into the ground water will.

That's why it is so important for people to be aware of protecting the land they live on. The list of human activities contributing to ground water contamination is nearly endless, and some of the threats from agriculture are of greater concern than others.

Farmers and ranchers in this area have a reputation of being very careful in their use of farm chemicals, and using the very latest technology available in applying pesticides, herbicides and fertilizer to the land. These chemicals are vital to Montanan's agriculture and to our methods of producing crops. However, if potential contamination sources are prevented from locating over critical recharge areas, the risk of contamination can be greatly reduced.

The quality of the water drawn from the Teton Aquifer, from which Choteau's water supply is obtained, tests excellent, and shows no traces of pollution, either from increased human activity or from agriculture.

Only rarely does the combination of conditions occur which allows pesticides, herbicides and fertilizers to reach groundwater. By being aware of these considerations you can apply these products in ways which will make the potential for groundwater contamination even less likely.

Here are a few ideas for farmers, ranchers and individual landowners to consider in helping protect the groundwater:

- Follow label directions for mixing, application rates and cleaning and disposal methods.
- Calibrate sprayers for accurate application. Apply pesticides only when they are absolutely necessary. Avoid the temptation to use more product than the label directs. "Overdosing" will not do a better job of controlling the pests.
- Prevent spills and back-siphoning.
- Avoid overuse of nitrogen and other fertilizer materials. Never apply nitrogen fertilizer without first having a soil. Use nitrogen sources which have demonstrated resistance to leaching.
- Plug abandoned wells. This will prevent entry of contaminants through these structures.
- Watch for chemical leaks, and properly store farm chemicals to prevent spillage, leakage and leaching into groundwater.
- Handle hazardous products carefully. Do not dispose of unused chemicals in septic tanks, landfills or on the soil surface.
- Look into integrated pest management programs which combine chemical use with other production practices to manage pests. Contact your local Cooperative Extension Service office for more detailed information.
- Use weather forecasts and observations and irrigation scheduling to predict when excess surface water may be a problem. Common sense observations also can be helpful in deciding if it would be prudent to delay application of certain products to prevent wash-off or surface runoff.
- Everyone knows that it is more economical and efficient to prevent groundwater contamination than to clean it up, and it's everybody's job to protect the water source they use.

Lawn or Not?

Jeanette Rasmussen

Have you ever considered not having a lawn?

Many residents along lake shores or river banks have opted to replace their well-manicured lawns with native vegetation and by adding trees and shrubs.

Choteau is not a shoreline community, but because of the shallow depths of the groundwater, the source of the municipal water supply, many of the recommendations for people who live along a shoreline and have lawns could also apply to the Choteau area.

No one is recommending that you tear up your yard, but you should realize that what you put on your lawn to make it lush and green, could get into your groundwater supply.

Lawn and garden fertilization can accelerate and stimulate the growth of algae and rooted aquatic plants. Soils have a limited ability to retain excess nutrients, which may move into the groundwater. In addition, fertilizer application may diminish the level of septic system waste treatment by saturating the soil with the nutrients from fertilizers.

Here are some ideas for maintaining your lawn and, at the same time, protecting the groundwater.

- Add more trees and shrubs, and let the natural vegetation take over. Deeply rooted plants can take up nutrients from the soil, instead of allowing them to seep into the groundwater.
- If you are establishing a new lawn, plant a fescue mixture rather than bluegrass. The annual nitrogen requirement of fescue is less than half of that required for bluegrass.
- Do not cut the lawn too short. This allows healthier, greener growth with less fertilizer. The recommended cutting height is 2 to 2½ inches. The grass will shade the weeds and crowd them out. Leaving thatch on the lawn helps to retain moisture in the soil and provides a slow supply of nutrients as it decomposes.
- Water properly. A thorough weekly watering during dry spells promotes deeper root growth and healthier grass than light watering which promotes shallow root growth. Excessive watering can cause nutrients to leach from the soil and move into the groundwater.
- Use the smallest amount possible of nitrogen fertilizer to maintain a good grass cover - this may be none at all. Fertilize with nitrogen in the spring using small amounts of a slow release form of nitrogen. This will allow the grass to use the nitrogen and grow well while minimizing the amount of fertilizer capable of entering the groundwater.
- Do not use fertilizer containing phosphorus unless a soil test indicates a need for it.
- Avoid herbicides and fertilizer-herbicides mixtures, or treat the weeds in the fall. This minimizes runoff and reduces the chances of injury to trees and shrubs.
- Dispose of leaves in the fall by constructing a compost pile.

Water Conservation

Jeanette Rasmussen

Water is vital to each of us every day. It is the liquid we need to live.

Anyone who lives in Montana, however, knows that drought can only be a day away!

Experts agree that America's water use will double by the year 2000, and in some areas shortages are appearing already. That is why it is vital to conserve water, even though it appears that the water in our Teton Aquifer seems never-ending. We must learn to conserve water now in order to avoid severe shortages in the future.

This summer, especially, rivers and streams in this area of Montana are running about half the water that a 30-year normal would dictate. These drought conditions also affect the amount of water available in aquifers too, and experts report that the water table in many areas of the Teton Valley has already dropped two to three feet. So even though the lush, green valley around Choteau doesn't seem threatened, it is always in vogue to conserve water.

When water shortages occur, water users are asked to cut town domestic use of water so that water will be available for fire protection. Domestic use describes the water that is used inside the home or business for drinking, cooking, bathing, washing clothes, brushing teeth, etc. This use typically does not exceed 100 gallons per person per day.

Water used for lawn and garden irrigation should not be regarded as essential when water shortages occur.

Conserving water should be an every day happening in your home, however, not just during dry years. Watching our water use will conserve it for future years.

Here are some common water wasters, and ways you can stop them:

- Lawn Watering, car washing, sidewalk cleaning. Watering during cool parts of the day, deep-soaking the lawn when watering, and only watering when needed can keep a healthy lawn and save thousands of gallons of water over a summer. Water slowly and thoroughly. Let grass grow taller in hot weather. Check your hose and connectors. Repair or replace leaky parts or sections.

- Turning off the hose as you soap the car, or using a broom instead of the hose to clear sidewalks and driveways will also save lots of water. Your garden hose can pour out 600 gallons or more in only a few hours.

- Leaking faucets -- A slow drip from a single faucet can waste 15-20 gallons of water every day. That adds up to almost 6,000 gallons of water every year. Replacing washers corrects the leak and is inexpensive to do.

- Toilets -- Invisible toilet tank leaks can waste hundreds of gallons each day from each toilet. To see if yours leaks, put a few drops of food coloring in the tank. Without flushing, wait a few minutes and see if the color shows up in the bowl. If it does, adjust the mechanism controlling the plunger ball or replace the ball. Toilets also often have water wasted through overflow in the tank. If yours overflows, try to bend the arm until the valve shuts off about ½ inch below the overflow.

- Installing a water-saving displacement device in your toilet doesn't hurt your plumbing, and saves water. Try using a toilet dam or a weighted plastic jug full of water. Do not use a brick -- it may disintegrate and cause problems.

- Using the toilet to get rid of trash is a water-costly method of dumping garbage. Each time you flush you use 5-7 gallons of water, and additional flushing not only uses an excess of water, it can also be hard on your septic system or the municipal sewer system.

- Dishwashers and clothes washers -- More than 10 percent of all water used in the home is used in the washing machine and dishwasher. Try to use these appliances with full loads only. Even short-cycle options on these machines are less water efficient than running a full load. For household cleaning jobs, use low-sudsing, biodegradable detergents to result in cleaner rinse water which can be used again.

- Long showers -- Each minute of showering can use 5-10 gallons of water. Limiting shower length or installing flow restrictors (available at hardware stores_ can save hundreds of gallons each day for a typical family. A partially filled bath may take less water than a long shower, yet a short shower may use less water than a bathtub filled with about 5 inches of water. And, although it may sound silly and unnecessary, think about re-using bathing water to water your shrubs, lawns or use it for heavy cleaning jobs.

MONTANA DEPARTMENT OF PUBLIC HEALTH AND HUMAN SERVICES
LABORATORY SERVICES BUREAU

The Montana Chemistry Laboratory Bureau and the Public Health Laboratory Bureau, of the former Department of Health and Environmental Sciences, have been combined into one Bureau. We are now named the Laboratory Services Bureau and we are part of the Department of Public Health and Human Services (DPHHS). We are still located in the Cogswell Building in the Capitol Complex. The water laboratories of the Laboratory Services Bureau are certified by EPA to test public and private water supplies for the analyses required for the Safe Drinking Water Act (SDWA). Our goal is to provide timely quality testing in the most cost effective manner. In addition to offering a wide range of analytical and microbiological testing, the Laboratory Services Bureau also offers consultation services to provide technical assistance to all those who ask. In addition, we offer a comprehensive accounts management system, which provides a monthly record of tests performed and fees, and we offer automatic reporting to the Water Quality programs in the Department of Environmental Quality, when needed. We are now able to provide testing for areas of compliance monitoring for discharge permits. Please contact us at 406-444-2642 if you have any questions regarding testing or other services.

IF YOU NEED:

- COMPLIANCE MONITORING for Phase II and Phase V Regulations or permitting requirements;
- MONTHLY COLIFORM TESTING for routine monitoring of bacterial contamination;
- LEGALLY DEFENSIBLE DATA to demonstrate compliance to any third party;
- QUALITY ASSURANCE / QUALITY CONTROL with essential documentation;
- TECHNICAL CONSULTATION for any questions;

WE OFFER:

- STATE-OF-THE-ART INSTRUMENTATION for testing
  - Drinking Water
  - Solid and Hazardous Waste
  - Soils
  - Petroleum
  - Surface Water
  - Ground Water
- FAMILIARITY WITH REGULATIONS
- COMPLETE ORGANIC AND INORGANIC TESTING
- DATA TRANSFER CAPABILITIES to other State agencies upon request
- RESOURCE FOR AGENCIES involved in regulation

Call or Fax us with your questions or to get information about our services.

Phone: 406-444-2642 Fax: 406-444-1802

CALENDAR OF INFRASTRUCTURE EVENTS

by Barbara Neuwerth, DEQ-WQD

Are you planning, designing or financing an infrastructure project (i.e. water, wastewater, solid waste) in the next year or two? Do you have all the information you need on how to hire an engineer, how to write a grant or loan application, how to manage or finance a project?? If not, you need to attend one or several of the upcoming events that are offered during the next four months!

Infrastructure projects are complex and demand much time and planning from a community. These following seminars and conferences will provide your community with information it needs to coordinate the numerous aspects of an infrastructure project. Many organizations are coordinating efforts to offer you the information you need to make your infrastructure projects progress smoothly. Check these events out and register to attend so that your community is informed and ready to proceed with its infrastructure project.

The Montana Rural Water Association (MRWA) Annual Conference:

February 14-16, 1996 in Great Falls at the Heritage Inn: During the MRWA Annual Conference, a **special infrastructure financing grant and loan workshop will be held on February 15 from 1-5pm.** Contact the MRWA office in Great Falls either by phone (406-454-1151) or fax (406-454-3116) for details and registration information.

U.S. Department of Agriculture Rural Economic and Community Development (RECD) Engineer Training:

RECD invites Montana consulting engineers and project managers to one of two state-wide information meetings on its water and waste program. Each of these four-hour meetings will explain current funding levels for grants and loans, application process, obligation of funds, agreement for engineering services and engineering requirements for design and construction. No is no charge for attendance, however advance registration is required and seating is limited. **Register by calling 406-585-2520 or sending a FAX to 406-585-2565.**
(Note: the RECD engineer training is planned the day before the MWEA sponsored seminars so that participants can attend both seminars while making only one trip.)

March 5, 1996; 10am-3pm in Billings at the Clarion, 1223 Mullowney Lane; 406-248-7451

March 19, 1996; 10am-3pm in Missoula at the Holiday Inn; 200 South Pattee; 406-721-8550

Montana Water Environment Association (MWEA) is jointly sponsoring, with the Montana Departments of Commerce and Environmental Quality, **two Infrastructure and Financing Seminars.** At both of these seminars state and federal financing agencies will be presenting funding alternatives. **Contact Bill Bahr at 406-444-5337 for registration information for the MWEA jointly sponsored workshops.** See a related article and agenda for these two

MWEA seminars in this publication. The following dates and locations have been confirmed:

March 6-7, 1996 -- in Billings at the Clarion; 1223 Mullowney Lane; 406-248-7451. Rooms have been set aside for those attending the MWEA seminar. Call the Clarion to reserve your hotel room at the conference rate of $30.00 plus tax.

March 20-21, 1996 -- in Missoula at the Holiday Inn; 200 South Pattee; 406-721-8550. Rooms have been set aside for those attending the MWEA seminar. Call the Holiday Inn to reserve your hotel room at the conference rate of $35.00 plus tax.

Montana Multi-Agency Grant and Loan Application and Information Workshops:

March 26, 1996 in Glasgow at the Cottonwood Inn

March 28, 1996 in Miles City at the Miles Community College Room 106.

Contact Barbara Neuwerth 406-444-5322 or Gus Byrom 406-444-4477 for more information.

Montana Environmental Training Center (METC) sponsored Grant Proposal Writing Seminar:

March 26-27, 1996 in Great Falls at Montana State University-Northern (1211 NW Bypass). This seminar is geared to state and federal financing programs with an emphasis on writing grant proposals. See related article in this publication for registration information or contact: Bob Broadway 406-965-3944; Jan Boyle 406-454-2728. Registration is required, cost is $90 per person.

INFRACON '96 (Governor's Infrastructure Conference):

May 8,9,10, 1996 at Billings - See the **INFRACON '96** article in this publication for more details on the conference or call Linda Reed 406-444-5504, at the Governor's Office.

At the MRWA, MWEA, Montana Multi-agency and Infracon '96 events, representatives from the U.S. Department of Agriculture Rural Economic and Community Development Program (formerly Farmer's Home Grant and Loan Program); Montana Department of Environmental Quality (State Revolving Fund Loan Program); Department of Natural Resources and Conservation (Renewable Resource Grant and Loan Program); and Department of Commerce (Community Development Block Grant Program, INTERCAP Loan Program and Treasure State Endowment Grant and Loan Program) and will present grant and loan information for 1996-97 funding cycles.

Call the contact and register now so you will get the information you need to assure the success of your community's infrastructure project!

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FLOOD CLEANUP HEALTH TIPS

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)
AND
MONTANA DEPARTMENT OF PUBLIC HEALTH AND HUMAN SERVICES (DPHHS)

In order to provide one convenient source of emergency health information for those who must return to, live in, and salvage flood-stricken homes, DEQ/DPHHS has summarized in this brochure information released by various state and national agencies, as well as the recommendations of local health agencies. Several kinds of diarrhea illness and other communicable diseases are more common in areas experiencing flooding. The major reasons are the use of unsafe water and unsafe food.

DISINFECTING WATER

All water possibly contaminated by flooding must be disinfected, whether from wells, springs or cisterns. Bottled water which has not been in contact with flood water may be used during cleanup, if available.

Drinking water may be treated by one of the following methods.

1. Boil water for five minutes and store in a clean container. The flat taste can be improved by shaking the water in a bottle or pouring it from one container to another. Boiling is the preferred method to prepare drinking water from sources that have been flooded.

2. Mix 5 drops of liquid chlorine household bleach with 1 quart of water (or 20 drops per gallon) and let stand for at least 30 minutes or longer before drinking. Liquid chlorine bleach can be obtained from most grocery and convenience stores. Do not use scented bleach, or bleach that contains detergents or other additives.

Once flood waters have receded, wells, springs or cisterns should be adequately protected against all known sources of contamination before disinfecting the supply. To disinfect, mix two quarts of liquid household bleach with ten gallons of water and pour the contents down the well (inside the casing). Replace well cover and turn on a water tap until there is an odor of chlorine. Turn off the water and do not use it for eight hours. Then open all taps and spigots and flush out the chlorine until the odor has disappeared. Do not flush the water into septic systems or into perennial streams or lakes.

The effectiveness of disinfection should be checked after completing the above process by submitting a water sample to a laboratory to be analyzed for the presence of coliform bacteria. The sample should be collected in a container supplied by a certified laboratory and in accordance with laboratory instructions. Bottles and instructions can be obtained from the DPHHS Public Health Laboratory in the Cogswell Building in Helena, phone #444-3444.

For further information, please call the Water Quality Division at 444-4549, or your local sanitarian.

SALVAGING DAMAGED FOODS

STORED FOODS

To prevent diarrheal diseases and other illnesses, the following items should be destroyed if they have been exposed to flood waters: fresh meats, poultry, fresh vegetables, fruit; prepared and processed foods; home canned foods; medicines and cosmetics; packages that are not hermetically sealed (airtight), including flour, packaged frozen foods and other commodities in bags.

SHELF STABLE AND CANNED FOODS

Seepage can carry harmful bacteria into all but airtight containers, the contents of crown-capped bottles, screw-top glass containers (including canned food in glass jars) and unprotected flexible packages should be destroyed. Sealed metal cans if punctured, bulging or leaking are unsafe.

Sealed metal cans and hermetically-sealed packages with protective outer packaging, and which are in good condition may be salvaged but they must be carefully cleaned and disinfected before using the contents. If such packages are perforated, leaking, bulging or show any evidence of puncture they should be destroyed. Salvage tips are summarized briefly below--contact your county sanitarian for detailed salvage information.

Follow this procedure:

1. Remove labels. Keep the same kinds of foods together, or mark them in a way that will enable you to identify them after disinfection. Colored crayon, wax pencil, indelible marker, or adhesive tape may be used.

2. Wash cans in warm water containing soap or detergent.

3. Soak the cans for at least 1½ to 2 minutes in a tub containing a disinfecting solution made by mixing two tablespoons of household bleach with two gallons of water. Rinse in clear water that is bottled, disinfected, or which has been previously boiled for at least 5 minutes.

4) Re-inspect the packages. If there is any doubt about the integrity of any package, do not use.

Hermetically sealed foods which normally require freezing or refrigeration should not be salvaged unless they have been continuously held within the proper temperature range, (see REFRIGERATED FOODS).

REFRIGERATED FOODS

During flood conditions, natural gas, electricity and other utilities may be down. Most food storage refrigerators are electric, and during floods, are often down for hours or days. Discard foods needing refrigeration (milk, eggs, meat, puddings, fish, canned hams labeled "Keep Refrigerated"... if the refrigerator has been down for more than six hours, or if the food has been warmed to above 45°F for more than 3 hours. Where power is expected to be reinstated within minutes, keep the refrigerator or freezer door closed as much as possible.

Where power is out or turned off and alternate refrigeration is not available, foods normally requiring refrigeration should be placed in temporary insulated containers or ice chests and transported to alternate refrigeration as soon as possible. In no case should they be left without refrigeration for more than 4 hours. Wherever possible the temperature should be held below 45°F. If the times and temperatures

are unknown, it is recommended that the food be discarded. "When in doubt, throw it out." Butter, margarine, hard cheeses, pies, fruit, preserves, breads, quickbreads, fruits, salad dressing, jelly, relish, barbecue sauce, tartar sauce, horseradish, mustard, catsup, and olives which have been unrefrigerated for up to 4 hours may be salvaged if placed in refrigeration immediately, provided, they have not been in contact with flood water.

Frozen foods should also be transported to alternate freezers in well insulated chests or boxes. Those that have been thawed for more than four hours should be discarded. Others which are thawed for up to three hours should not be re-frozen, but can usually be salvaged.

CLEANING CLOTHING AND BEDDING

Since disease-producing bacteria often carried by floodwater can remain alive for long periods in and on fabrics, care in laundering clothing and bedding is essential.

First, brush off all dirt, and if mud-stained, rinse in cool water until as much mud as possible is removed. Then wash as usual, using enough detergent to keep soil from redepositing on fabrics.

The use of a disinfectant in the rinse water is especially recommended to destroy bacteria. For white fabrics, household bleach is recommended. Your local market may have other products for other fabrics. Manufacturers directions should be followed carefully.

Some types of mattresses with absorbent ticking and covering when soaked with floodwater should be discarded since reconditioning is too difficult to be done at home. There are types, using synthetic coverings or less absorbent materials which can be dried (takes several days), and sanitized, preferably in the sun, and may be suitable for re-use. The general recommendation is to discard them.

However, foam rubber pillows, if left in their covers, may be washed and air dried. Do not use an automatic drier or dry cleaning solution.

ENTERING DAMAGED BUILDINGS

If there are any doubts about the safety of a building which has been flooded, do not enter it. Seek professional advice first, and arrange for assistance wherever possible. Information and advice may be available from the Fire Department or the Disaster and Emergency Services agency in your area. Also, shelters, safe food and safe water may have been set up by a public service agency.

Even with guidance and assistance as mentioned above, when you do enter a damaged building, check it for buckled walls, electrical hazards, loose bricks, cracks or any shifting of the foundation.

Do not pump flooded basements out too quickly, because the water-saturated ground around the basement could push the walls in. Also be alert for electrical hazards.

GAS OR ELECTRIC SERVICE

Follow the instructions of your utility company concerning the restoration of gas or electrical service. If unusual situations occur, call for guidance.

IMMUNIZATIONS

There is no indication for typhoid immunization in most flood emergencies. Typhoid immunization requires about six weeks to become effective. Immediate protection from diarrheal diseases can best be provided by using only bottled water, water which has been boiled for five minutes or treated chemically, and by discarding food which may have become contaminated, or which was not held at the proper temperature due to power outage.

Tetanus toxoid is needed only on the recommendation of the attending physician in the case of an actual injury or wound. The flood itself imposes no additional risk of tetanus.

If hepatitis or other immunizations are indicated, the information will be provided to the radio, television and newspapers by the County Health Officer.

PERSONAL HYGIENE

Several simple rules of personal cleanliness should be followed:

1. Wash hands with soap and water after using the toilet or participating in flood clean-up and handling flood-contaminated articles--and use bottled or disinfected water.

2. Be sure handwashing is done before and after smoking, using bottled or disinfected water.

3. Use boiled or disinfected water for brushing teeth and other personal hygiene.

SAFETY PRECAUTIONS

During the urgency of clean-up time, people are often inclined to overlook proper safety measures. Some people may become over-excited, or anxious. Below are a few reminders:

1. Set priorities, accomplish the vital tasks first and avoid physical overexertion.

2. Regardless of the crisis, be sure children are safe and being cared for at all times. Never leave them alone or allow them to play in flood-damaged buildings or areas that might be unsafe.

3. Give special attention to cleaning children's toys, cribs, playpens and play equipment. Items a baby or toddler may put in his mouth should be boiled. Discard all stuffed toys and those that are not easily cleaned or are water logged.

4. Keep chemicals used for disinfection and poisons for insect and rodent control out of reach of children.

5. Wear protective clothing covering limbs, feet and hands while cleaning up debris and rubber gloves while scrubbing flood-damaged interiors and furniture.

6. Be sure electrical appliances are dry and in good condition before using.

7. Monitor the radio and other media for current information, and do not travel when advisories

warn against it. Let friends and relatives know that you are all right when you have a good opportunity to phone or fax. If phone lines or down or their use restricted, observe the public bulletins.

MEDICINES

Discard all medicines exposed to flood waters and have all needed prescriptions refilled as soon as possible.

CLEANING OF COOKING AND EATING UTENSILS

Flood water usually is contaminated with sewage. Dishes, pots, and pans that have been covered by flood waters should be carefully washed and disinfected before use. Wash everything in hot, soapy water using a brush, if necessary, to remove dirt. Rinse everything thoroughly in safe water, then disinfect by immersing for one minute in a chlorine solution made up of four tablespoons of liquid household bleach in two gallons of water.

Pots and pans can be sterilized by boiling for at least ten minutes. Dishes with deep cracks should be thrown away.

FOOD PREPARATION

Here are a few hints to insure safe and easier meals:

1. Boil for five minutes all water used for food preparation (or use bottled water which has not come in contact with flood water).

2. Wash hands and cooking utensils in a disinfecting solution made by mixing one-half teaspoon of liquid commercial laundry bleach with 2½ gallons of water.

3. Conserve fuel, water and energy, as well as the number of cooking and serving utensils, by preparing casseroles and one-dish meals, such as stews, pot roasts and thick, nourishing soups.

4. Boil and save the liquids of canned vegetables. Substitute them for water in recipes for soups, stews and other cooked dishes.

5. Drain and save juices from canned fruits. They may be mixed and combined with other canned fruit juices and used as beverages and in making gelatin salads/desserts, instead of scarce water.

6. If your oven is in working condition, use it to cook stews, vegetables and other foods. Oven cooking will require less attention and free you to do other tasks while the meal cooks.

7. If you lack refrigeration, cook only as much as can be eaten at one meal. If you have refrigeration, save time by preparing food for several meals in advance.

8. When purchasing formula ingredients, evaporated or dry skim milk for infants, be sure the containers are sealed. After opening in the home, be sure they are tightly covered to prevent contamination. In the absence of refrigeration, make up only enough formula for immediate use. If mixing powdered milk or dry formula, be sure to use bottled water, boiled water, or disinfected water (refer to page 1 disinfecting water procedures).

9. Avoid foods that are subject to quick spoilage and bacterial contamination, such as creamed

foods, hash, custards and pies, salads and sandwiches mixed with mayonnaise or other perishables, unless refrigeration is available.

10. Hashes, croquettes, meat pies and ground meats are easily spoiled and contaminated. If used, they should be served promptly.

11. Avoid keeping prepared or cooked food at room temps. Keep hot foods hot and cold foods cold.

12. In general, during the flood, commercially canned and packaged foods are recommended: canned dried milk; canned meats, fish, poultry; canned fruits, vegetables and juices; packaged, dried or dehydrated foods; canned or packaged biscuits, breads, crackers, cookies; frozen foods which have not been exposed to flood water or thawed.

PROCEDURE FOR CLEANING UP AFTER FLOOD

All food containers such as cans and bottles which have been touched by the flood must be examined to see if they are still water-tight. If there is any indication that the water has gotten inside them, the container and the food must be thrown out. Even if they were submerged for only a short period, they should be salvaged only according to safe procedures. See the "SALVAGING DAMAGED FOOD" section on page 2 and 3.

Clean the building of all silt and refuse left by the flood. After dirt has been removed all wall and floor areas which have been touched by the flood water should be washed down with washing powder (not soap) and then rinsed with a chlorine solution. If the presence of "Flood smell" remains, the building has not been thoroughly disinfected. Care should be taken to wash chlorine solution from any metal objects 15 minutes after it has touched them to prevent rusting.

EMERGENCY HOME SANITATION

* Personal hygiene, particularly handwashing is one of the most important measures for preventing illness from flood contamination. Always wash hands before eating!

* Do not use contaminated water or water which is questionable, for any domestic use, including cooking, drinking, bathing, brushing of teeth etc., Until it has been treated.

* Persons on contaminated community water systems should boil the water or treat with chlorine (laundry bleach) until official notice is given that the water supply is safe. Bottled water is also acceptable.

* See the food information on pp. 2-4. All eating and drinking utensils should be sanitized besides being thoroughly cleaned. A solution of two tablespoons of laundry bleach to five gallons of water is recommended as a sanitizing solution.

* Wash solution for laundering clothes, bedding, etc, should include a disinfectant. Laundry bleach or other commercially available products may be used. Follow directions on containers.

* Inside surfaces of homes contaminated by flood waters should be cleaned with a solution involving powdered cleanser (use according to manufacturers instructions). It is important to rinse affected walls and floors with a chlorine solution (household bleach and water--not more than ½ cup per 2 gallons of water). After a few moments rinse chlorine solution from metal or wood grain surfaces to prevent

chemical reactions or rusting. Do not apply strong chlorine solution to rubber, organic material, carpeting or other absorbent surfaces.

MOSQUITO/VECTOR CONTROL

Intensified mosquito problems resulting from flooding could involve an increased threat of mosquito borne diseases. More likely, however, increased mosquito populations will involve "pest" types of mosquitoes. Their effects will be expressed in terms of intense personal discomfort, some shock reactions, and increased cases of secondary infections.Not all water produces mosquitoes. Water which is open and deep, or has little shallow area, and that which is running and is relatively free of emergent vegetation does not. Temporary, shallow, standing water that lasts for five days during exceptionally hot weather can produce hordes of pest mosquitoes. More typically (at peak air temperatures of 80 - 90 degrees F.) the egg to adult developmental time will be 7 or 8 days. The encephalitis bearing mosquitoes and related forms lay eggs on the surface of permanent or semi-permanent water which is typically shallow and has emergent vegetation. To establish if water does rear mosquitoes, dip out some water (near the surface and close to vegetation) at weekly intervals. Examine it for the aquatic stages (eggs, larvae/wigglers, and pupae/tumblers).

APPROACHING MOSQUITO CONTROL

While organized mosquito abatement districts can do more to control mosquitoes than an individual or small independent group, the property owner may be able to do much to protect his health, recreation and economy. Persons living closest to a rearing site will have the greatest reduction of the number of mosquitoes in their area when mosquitoes are controlled at their source. Although some types of adult mosquitoes may commonly fly from 3 to 5 miles, they thin out as they disperse from a rearing site and most move only far enough to feed. Consult your local mosquito control organization, local health department, or the Food and Consumer Safety Section 444-2408, for further information.

RULES FOR REDUCTION OF MOSQUITO PRODUCTION

1. Remove unneeded standing water on your property. Most aquatic stages die if water is removed. Discard tires, cans, etc., which hold water. Restore drainage.

2. Stagnant pools or swampy places should be filled, drained, or deepened when practical. Remove debris and floating and emergent vegetation from needed pools or those which cannot be filled or drained. Avoid having shallow pond margins--steep straight banks without emergent vegetation provide little cover for mosquito larvae.

3. Ornamental or stock watering ponds can be stocked with fish. Trout or other game fish keep ponds from rearing many mosquitoes if vegetation is not too dense. Mosquitofish are effective.

4. Surface irrigated fields should be properly graded. Low areas in fields that pond water are major sources of mosquito production.

5. Do not over irrigate fields and pastures. Using only necessary amounts of water (with adequate fertilization) increased hay quality and yield as well as reduces mosquito production.

6. Do not permit field laterals and drains to contain excessive amounts of vegetation. The on-field ditches should be regularly cleaned and maintained to reduce mosquito habitat.

7. Biodegradable mosquito control "oils" may be applied to standing water. (Examine water for

larvae prior to any treatment). These oils are much less harmful to fish and vegetation than Kerosene or fuel oils and have been used where livestock take water.

8. Registered insecticides can be applied to mosquito rearing water on your property if applied according to label directions.

TO MINIMIZE ADULT MOSQUITO ATTACK

1. Minimize the amount of mosquito rearing water on your property according to the RULES.

2. Keep lawns clipped short, weeds cut and bushes trimmed to reduce the cover provided to adult mosquitoes.

3. Keep window and door screens in good repair.

4. Repellents having a variety of active ingredients may be used for temporary relief. The U.S. Public Health Service and Consumer Reports state that the most effective repellent chemical is diethyl toluamide. Follow label directions and precautions.

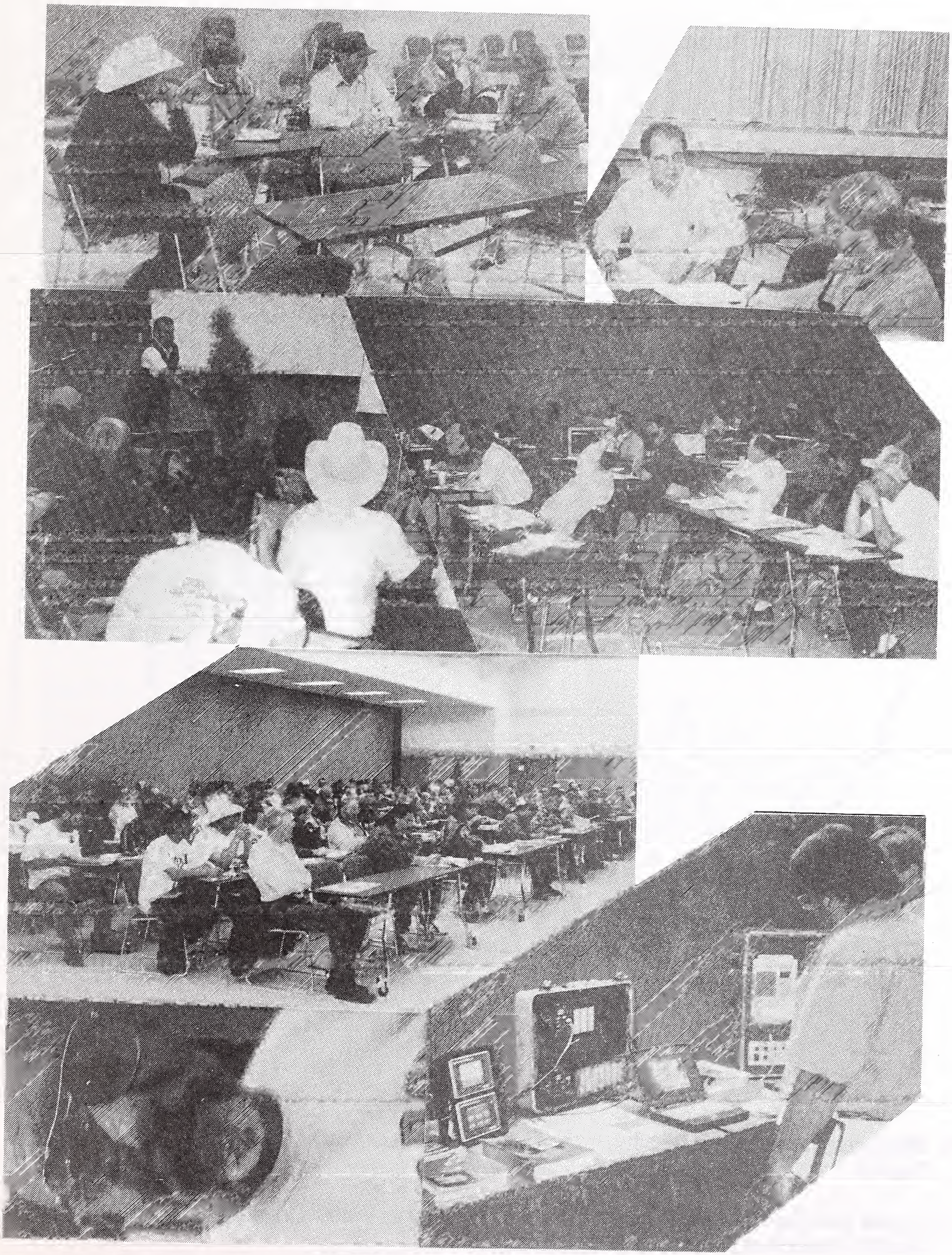
5. Registered insecticides can be used for adult mosquito control. They can be applied to adult resting places as short term residual sprays, or space (contact) sprays can be drifted through areas on light air currents at dusk or dawn to kill adult mosquitoes present at that moment. All insecticides must be used in accordance with label directions and restrictions.

In the event of a federally declared disaster, federal financial assistance for the control of mosquito vectors may be available, provided a serious health hazard to humans has resulted or is developing which is clearly beyond State and local capabilities. Such vector control must be approved by the Center for Disease Control and Federal Disaster Assistance Administrative Regional Director. Mosquito control work to eliminate a nuisance condition clearly not a serious health hazard, is not eligible.

SCENES OF THE 1995 OPERATORS SCHOOL IN BOZEMAN

Over 200 operators, managers and other water quality professionals gathered for the 62nd Annual Fall Water and Wastewater Operators and Managers Water School at Montana State University in Bozeman in September. With over 70 different sessions, and 50 speakers, there were plenty of activities and opportunities to learn about our professions during the week. We had a bigger vendor show with nice gifts to present, and the school had a basic, non-CEC track of classes to help operators complete their preparations for the certification exam given on Friday. A big thank you to all the staff that put this together and to the water professionals who attended for making it one of the best yet, and to all the wonderful volunteer professionals who gave their time to provide training for all of us. (These scenes depict only a small part of what went on during the week.)



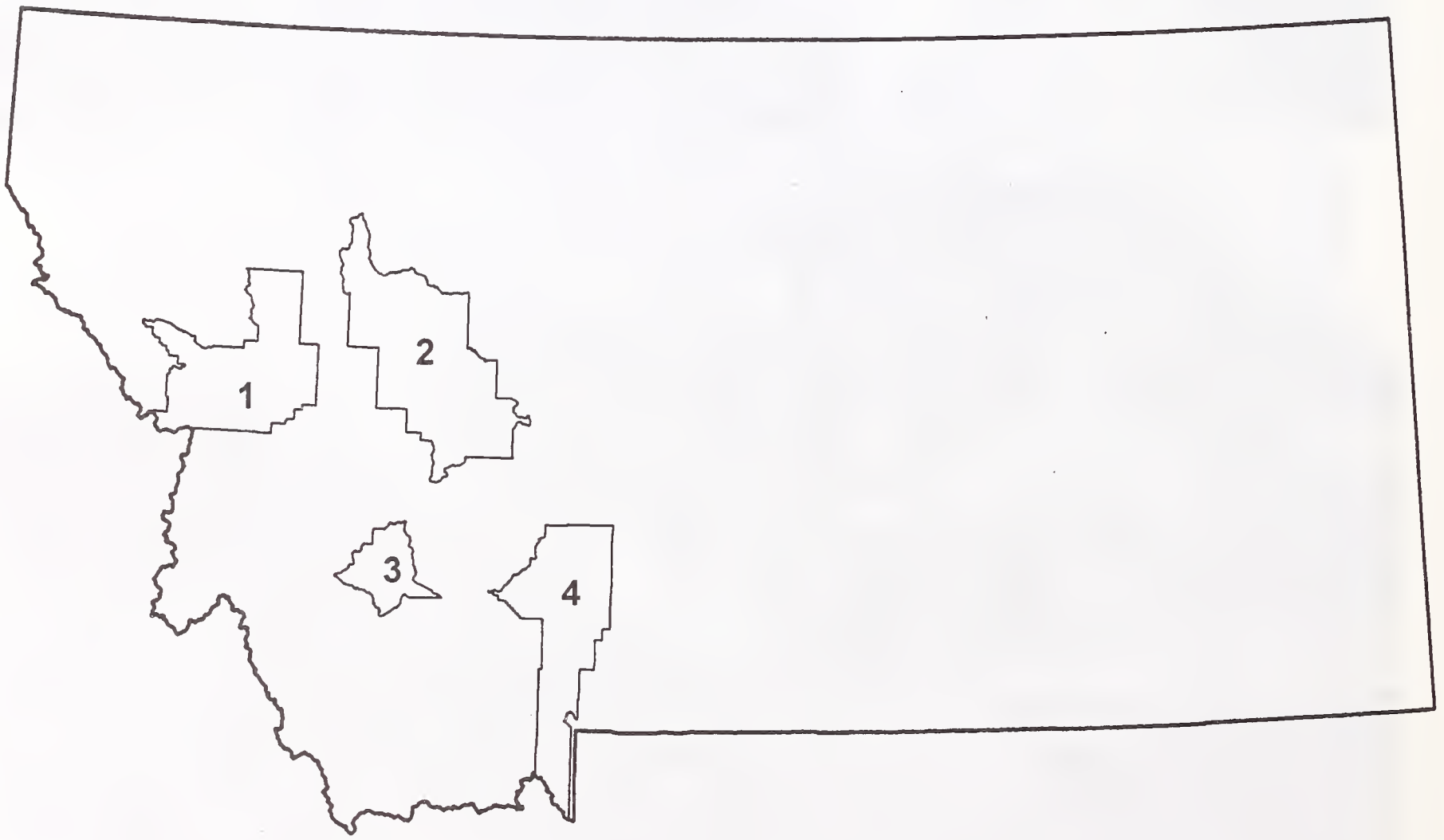


GALLATIN COUNTY CREATES MONTANA'S FOURTH LOCAL WATER QUALITY DISTRICT

On November 28, 1995, the Gallatin Water Quality District was established to protect, preserve and improve the quality of surface and ground water of the Gallatin Valley including the cities of Bozeman, Belgrade, and Manhattan. The district will be funded by an annual fee of $5.50 for urban property owners and $6.50 for rural property owners. The annual district budget will be about $96,000 to assess and monitor water quality and quantity, provide oversight and review for clean up of contaminated sites, assist the public water supplies with wellhead protection, address storm water drainage problems, and educate the public about water quality issues.

Table 1 summarizes the coverage, budgets, and number of employees of the four districts. Map 1 shows the counties that have established local water quality districts. District programs cover an area slightly larger than the State of Rhode Island.

COUNTIES WITH WATER QUALITY PROTECTION DISTRICTS



1. Missoula Valley Water Quality District
2. Lewis and Clark County Water Quality Protection District
3. Butte-Silver Bow Water Quality District
4. Gallatin County Water Quality District

Montana Natural Resource Information System (NRIS).

MONTANA LOCAL WATER QUALITY DISTRICTS

District Name	Cities included	Area covered by program	Annual budget	Number of full time employees
Lewis & Clark County Water Quality Protection District	Helena, East Helena	360 square miles	$94,474	1.5
Missoula Valley Water Quality District	Missoula	210 square miles	$459,816	3.5
Butte/Silver Bow Water Quality District	Butte, Walkerville	720 square miles	$125,020	2.2
Gallatin Water Quality District	Bozeman, Belgrade, Manhattan		$95,753	1.75
Total- 4 districts	8 cities	1,289 square miles	$775,043	8.95

RESIDENTIAL LEAD & COPPER MONITORING FROM HOMEOWNER TAPS, SCHOOLS AND WORKPLACES

Terry Campbell, Water Quality Division

In order to maintain Safe Drinking Water Act primacy in Montana, the Water Quality Division initiated requirements for extensive additional public water supply monitoring beginning in the early 1990's. Public water suppliers serving communities and those serving a school, or work place began sampling for corrosion byproducts in 1992 & 1993.



IS YOUR HOME FREE OF LEAD?

Montana systems have done an excellent job of responding to these additional requirements! As a staff member with the Water Quality Division, I have been impressed with everyone's efforts. MY THANKS TO ALL SYSTEM OPERATORS AND OTHERS WHO HAVE PERFORMED THE REQUIRED TESTING. Your efforts have allowed our program to concentrate on other issues which we feel warrant our attention. Also, your monitoring efforts have allowed the Drinking Water Program to pursue monitoring waivers by establishing a baseline. I think Montana's certified operators have done a lot to assure the public water supply is safe.

One new testing requirement was entitled the Lead & Copper Rule. In reality, it could easily be named the "Corrosion Control Rule". Because of the types of plumbing materials our past and current codes have allowed, we are now faced with levels of lead in drinking water in excess of what is currently considered safe. Lead service lines, lead containing solder used to join copper tubing and brass are all contributors. Even some galvanized pipe manufacturers used lead in the galvanizing coat.

Lead is primarily a health concern for young children and infants. Medical studies suggest very low dosages of lead can accumulate and remain in the human body for long periods of time and can cause fatigue, nausea, increased blood pressure, central nervous system disorders and brain damage. The damage done is irreversible! For those of us who have used lead sinkers for fishing (often biting the sinker to clamp it to the monofilament line), we now know why we are a bit slower than the rest of the world. For mature adults the risk is somewhat less, but blood pressure can be severely elevated due to lead exposure.

Many factors can contribute to lead and copper corrosion. Just having these materials present in a water supply system, or in home plumbing does not mean excess amounts of these materials will be present in water served to customers. Most times corrosion is due to the chemical nature of water. Remember the statement "no two waters are the same", because it certainly is true. Chemically, no two waters are the same. As a matter of fact your water supply is changing chemically all the time. Most of the time this change is slow enough we can assume certain things about the water will remain relatively constant.

When a chemist looks at your water to determine quality they typically look at hardness (calcium, iron and manganese content), pH (how acidic or basic water is) and specific conductance (how readily water passes an electric current). These three measurements tell a good deal about the possible chemical reactions which can take place when this water supply comes in contact with other components. These three tests are commonly referred to as "water quality parameter" tests.

These simple tests provide key information when a water system is experiencing corrosion. Corrosive waters typically fall into two categories; 1) acid aggressive and 2) conductive. Most commonly, low pH (acidic) waters are the cause of copper corrosion. This can lead to premature failure of water heaters, household plumbing and service lines. This form of corrosion is usually associated with thinning pipe walls due to dissolved copper particles being carried away by the water stream. Copper is a health concern for individuals with Wilson's disease (a cirrhosis of the liver condition) and can cause stomach disorders, liver and kidney disorders and anemia in otherwise healthy individuals when consumed at levels which allow copper to accumulate in the body. On the other hand, copper is also very necessary in small quantities as a mineral our bodies need.

Lead corrosion can also occur due to acid aggressive conditions, but usually lead corrosion is due to conductive (electo-chemical) reactions. By connecting two distinctly different metals it is known that we can set up an electrical cell (battery). Some batteries are better than others, but when we solder copper tubing with lead containing solder, we have effectively created a mild battery cell. This causes the flow of electrons between the two metal surfaces. When this type of a reaction is taking place, one metal is giving up ions to the other metal. Some of this material is then released into the water. Usually this type of corrosion is evidenced by "pitting" failures. When you see a lot of pin hole leaks, you can bet this corrosion cell theory is the culprit.

Softer surface waters and some groundwaters have a low amount of "Total Dissolved Solids". This means they also have a low specific conductance. Low specific conductance means an electric current does not readily pass through this water. Without being able to pass an electric current easily, it is unlikely a water system will experience conductive corrosion. On the other hand, when specific conductance is high, like in waters with high sulfate levels in Northeastern Montana, conductive corrosion is common and difficult to remedy.

Understanding the nature of corrosion is of vital importance when a water supplier starts to consider a treatment for controlling corrosion. Don't simply assume because a particular treatment worked for an associate "down the road" it will also work for you. Remember your water is chemically unique.

Corrosion control is a complex issue, but Montana water suppliers need to start giving the issue more thought. Of all the contaminants recently added to your sampling regime, lead is proving to be a more widespread concern for Montana's water systems than any other contaminant. Approximately 10 percent of the systems who have sampled for lead in consumer's homes have exceeded the lead, or copper standard. Approximately 35 percent of the school facilities with their own wells have exceeded the lead, or copper standards. If the health and regulatory experts are right, and we have to assume they are, then we have a serious health risk posed by release of corrosion byproducts in Montana.

PLANT AND EQUIPMENT START-UP: LUCK OR SKILL

by Kenneth Schnaars, P.E.
Consoer, Townsend & Associates
Nashville, Tennessee

INTRODUCTION

The starting of wastewater treatment plant equipment or facilities can be a source of pride for many people but especially to the Engineers and Operators. In order to insure that there is pride among the various parties involved, then the necessary precautionary steps must be performed prior to the start-up phase of the project. These precautionary steps should be started at the design phase where a mutual respect between the Operator and Engineer must be obtained. The Engineer must listen and incorporate as much of the Operator's ideas into the contract documents as possible. If there is a conflict with other design disciplines or there are theoretical questions, then the Engineer must clearly explain the situation to the Operator. The Engineer must not forget that the Operators virtually live at the treatment facility and their insight during the design is very important. The Operators must be aware that the project design is the Engineer's responsibility and in order to meet the requirements stipulated by the regulatory agency, the Engineer must have the final opinion.

This paper will discuss what factors contribute to a stressful start-up and how a municipality can avoid being placed in such a situation. Ideas are presented to help the municipality insure that they can achieve a successful project without the pitfalls.

STRESSFUL START-UPS

There are numerous situations or problems that could arise during a start-up that could hinder the final outcome. Some of these problems can be easily rectified by merely making a process adjustment or by changing to a standby piece of equipment. However, there are other problems that are more deeply rooted that could require months to resolve. The following list are some factors that could contribute to stressful start-ups:

a) Regulatory Mandates
b) Owner/Engineer Relations
c) Contract/Engineer Relations
d) Owner/Contractor Relations
e) Owner/Contractor/Engineer Relations
f) Manufacturer Defects
g) Inexperienced Start-up Personnel
h) Design Defects
i) Improper Construction
j) Poor Operator Training
k) Maintaining, Bypassing or Shutting Down Existing Systems While Starting New Systems
l) Staged Components
m) No Operator Involvement During the Design Phase or Pre-Start-up Phase
n) Lack of Operator Interest
o) Operator Fear of New Equipment or Processes
p) Community Involvement
q) Unknown Situations

Probably the three most difficult problems that occur during an initial start-up are regulatory mandates, design or manufacturer defects, and unknown situations. The items that cause long term problems are poor operator training, design or manufacturer defects, lack of operator interest, or operator fear.

Regulatory mandates are sometimes difficult problems because the municipality is usually under a strict compliance schedule and failure to meet this schedule could result in substantial fines. If the regulatory agency is steadfast on their compliance schedule, then sometimes equipment or processes must be placed into service before the contractor has fully completed the construction. Therefore, a process would have to be placed into service without having full control or capacity. This mode of operation normally results in more operator attention because flows have to be monitored frequently or equipment has to be controlled manually. Also, some equipment is usually temporarily wired under these conditions and they have a tendency to fail because the wiring connections are exposed to weather conditions or they jar loose. The staging of various process

components or the operating of existing equipment and new equipment can be a source of increased tension between the different start-up personnel.

Relationships between the Owner, Engineer and Contractor also have a direct effect on the outcome of the start-up. If there is a cooperative spirit between these three parties, then a start-up could go smoothly. However, if there is friction, hostility, or mistrust between any or all of these groups, then trying to accomplish the various tasks involved in a start-up could become difficult. For example, if there are poor labor relations between the parties, a start-up Engineer may not be able to perform his or her job because the Owner does not trust the Engineer and the Owner requires written explanations of each task. In another example the Contractor may not assist with the start-up because he or she feels that they are entitled to extra money.

Manufacturer defects, design defects or improper construction are all difficult and lengthy problems to solve. Each one of these situations requires a lengthy review period of the design calculations, construction procedures and/or the evaluation of the contract documents before a correction can be attempted. The start-up Engineer and Operators must work around this type of situation until the problem is resolved. If any one of these problems exists, they are further compounded by the sometimes deteriorating relations between the parties involved with the problem. To help alleviate manufacturer defects, the Engineer should specify factory tests on important equipment before shipment to the site. Design defects can be minimized by the Engineer through a good quality assurance program during the design phase. To reduce improper construction practices a qualified Resident Engineer must be on site daily to monitor the construction project.

There are times when community involvement can result in a very stressful start-up especially when the community has the backing of City officials and the news media. The two most common complaints that are voiced by the community are odors and noise. Since the community is usually unaware of the workings of a wastewater treatment plant, they normally assume that odors or other such problems can be resolved in a matter of minutes. Pressure by the community and City officials sometimes prolongs the commissioning phase because the Engineer and Operators are faced to resolve a number of small and immediate problems rather than evaluating the complete project. Public awareness and education prior to the project commissioning are two excellent tools for

informing the community on up and coming events and forewarning them of possible odors and noise.

Most Operators are normally enthusiastic about start-ups because of the new challenges and knowledge that can be gained from this procedure. However, there are some Operators that view start-ups negatively and they will not put their best effort forward. The lack of operator interest, the fear of new processes and equipment, or improper operator training have a lasting effect on the start-up of a facility. If the operators are not properly trained or they refuse to operate the facility, then the plant will continuously fall into a non-compliance category. The start-up Engineer could come back a hundred times and get the plant back into compliance but if the operating staff does not become involved with the operation, then the facility will never achieve the intended design conditions. Training starts at the beginning of the construction project when the contractor is laying pipes or forming walls. Knowing where the pipes are within the facility or the shape of structures can be helpful to the Operator when the plant is in service. Process and equipment training are also important to the Operators so they can fully understand the workings of the facility.

There are times when Manufacturers and Engineers send inexperienced personnel to a site to place a process or piece of equipment on-line. The use of inexperienced start-up personnel usually results in a longer commissioning phase because the start-up personnel themselves are going through a learning period. Also, inexperienced start-up personnel usually have problems training Operators and conveying the necessary information to operate the process or equipment. Normally Operators cannot evaluate their trainers until it is too late. During the Engineer/Owner contract negotiations, the Owner can request experienced engineering start-up personnel. Experienced manufacturer start-up personnel can be stipulated in the contract documents during the design phase. If these requests are documented, the Operator can request further training if they are not satisfied.

The most frustrating start-up problems are the unknown situations. Unknown situations are those problems that arise unexpectedly no matter how much pre-start-up planning and testing was completed. For example, the Contractor has installed a piece of equipment correctly, the start-up Engineer has completed his or her calculations and found everything acceptable, and the Operators are pre-trained on the equipment,

however, the equipment will not start, or it is making unusual noises, or it is not operating as designed. To correct these situations the start-up personnel must use a logical step by step troubleshooting approach to reduce the unknowns until a solution is found. Sometimes the most obvious solutions are overlooked for more technical reviews which results in prolonging the problem. The following steps should be followed to quickly resolve unknown problems:

a) Check the obvious
b) Eliminate the unknowns through troubleshooting techniques
c) Recheck the obvious

Unknown situations will arise during any start-up, therefore, the start-up personnel must be ready for them and learn how to correct their effect. For example, if a pump is not discharging the proper capacity, then the start-up personnel should eliminate the possible causes until a solution can be found:

a) Are the suction and discharge valves open?
b) Is there a blockage in the piping?
c) Is there a blockage in the pump?
d) Is the pump receiving the proper power?
e) Is the pump making any unusual noises?
f) Is there a manufacturing defect?
g) Is there a design error?

By going through a logical troubleshooting procedure an Operator can find a solution to any problem.

SUCCESSFUL PROJECTS

There is never one item or one person that can make a project successful. A good start-up depends on teamwork from all parties involved during the project. The following factors help to contribute to the success of a project and insure a smooth start-up:

a) Good Contract Documents
b) Good Construction Practices
c) Time to Pretest Equipment
d) Good Communications Between All Parties
e) Cooperation Between All Parties
f) Understanding the Conditions At Start-up
g) Good Operator Training
h) Experienced Start-up Personnel
i) Quality Equipment

If the Engineer provides clear and detailed contract documents for the project, then a good contractor can assemble the job with little guess work. The fewer discrepancies the Contractor encounters the more likely the project will be constructed as the Engineer envisioned. If the drawings are not clear, the Contractor may construct an area incorrectly which could result in a problem at start-up.

Having a conscientious Contractor is another important aspect to a successful project. The Engineer could supply clear contract documents but if the Contractor is in a hurry or is known for shoddy construction practices, then the plant commissioning can become difficult. A poor Contractor could have the elevations wrong, improper control wiring, leave construction debris in pipes or tanks, or could perform other improper type construction practices that would interfere with the starting of treatment processes or equipment. The Engineer's resident inspector must be very thorough with his or her inspection if a controversial Contractor is selected for the project. The treatment plant Operators can also help by informing the Resident Engineer if they see any problems with the Contractor's construction practices.

Pretesting equipment or allowing equipment to operate before it is actually needed for service can reduce a number of unknown situations such as electrical problems, bad motors, broken shafts, inadequate capacities, faulty automatic controls, or other such problems. When a piece of equipment has to be started without first properly testing it, then you are usually assured that a problem will arise. An equipment failure could prolong the start-up and result in fines from a regulatory agency. The pretesting of equipment after it has been installed and certified by the manufacturer is usually required

in the specifications and is accomplished by the Contractor and Manufacturer under the supervision of the Resident Engineer.

A process or piece of equipment can be commissioned more effectively if there is good communication and cooperation between the Engineer, Contractor, and Operator. Tanks and equipment are consistently taken out of service and placed back into service during the start-up phase so teamwork is necessary to insure there are no plant effluent violations, equipment damage, safety violations, or tank overflows. Planning meetings with the Operator, Engineer and Contractor prior to placing a process or piece of equipment on line are important to a successful project. During these planning meetings discussions about equipment readiness, electrical controls, possible problems, alternate flow routes or standby equipment can all be reviewed before placing a system on line. Having the proper personnel around during the commissioning phase, such as the start-up Engineer, Operator, Electrician, Contractor and/or Manufacturer is important for checking equipment, valves, or electrical components immediately so people are not waiting around if a problem develops. If the proper personnel are not present at the time of the start-up, delays will occur which could cost everyone money and hinder the relationships between different parties.

Understanding the conditions at the time of start-up is very helpful to the operating personnel. The start-up Engineer must know if the equipment is being placed into operation under a regulatory mandate or any other stressful condition. The start-up personnel must know if there are any industries contributing wastewater to the treatment facility that could damage equipment or inhibit the microorganisms. For example, a low pH waste entering the plant could result in equipment damage or a raw wastewater high in toxic materials such as cyanide or metals could be inhibitory to the microorganisms in the activated sludge process. Testing of the raw wastewater and data collection must be coordinated between the start-up Engineer and plant Operator. It is also important that the Engineer's start-up personnel know the design parameters, tank and equipment ratings, and the plant flow patterns before he or she enters the treatment facility. Not knowing this information could result in the facility not being utilized to the fullest potential.

Operator training cannot be stressed enough when it comes to the operation of new equipment or facilities. Without proper operator training the success of a project can never be fully achieved. By the time the Contractor, Engineer, and Manufacturer leave

the treatment site the Operator should have a good understanding of the operation, maintenance and safety aspects of the processes and/or equipment. The Operator cannot be expected to effectively operate a system if he or she does not fully understand how the system is intended to operate. The Operators must also know who they can call and they must know what resources and manuals are available if a problem arises.

In order to properly train the operating personnel, experienced start-up personnel are required by the Engineer and Manufacturer. Inexperienced start-up personnel cannot always optimize the process or equipment.

State and Federal requirements stipulate that the Engineer must list a number of different equipment manufacturers in the contract specifications so a competitive bid price can be achieved. However, if the specifications do not have a clause to pre-qualify manufacturers, there are times when an unknown manufacturer can become the low bidder. When this occurs the Engineer is usually forced to accept this manufacturer or face legal consequences. Sometimes the selected equipment is inferior and is subject to continuous failures. By not having quality equipment, a facility will incur higher maintenance costs, possible effluent violations, and client disillusionment in the Engineer and Manufacturer. Poor quality equipment can result in delays to the start-up phase of the project and can result in extra costs as the result of fines or legal fees.

CONCLUSIONS

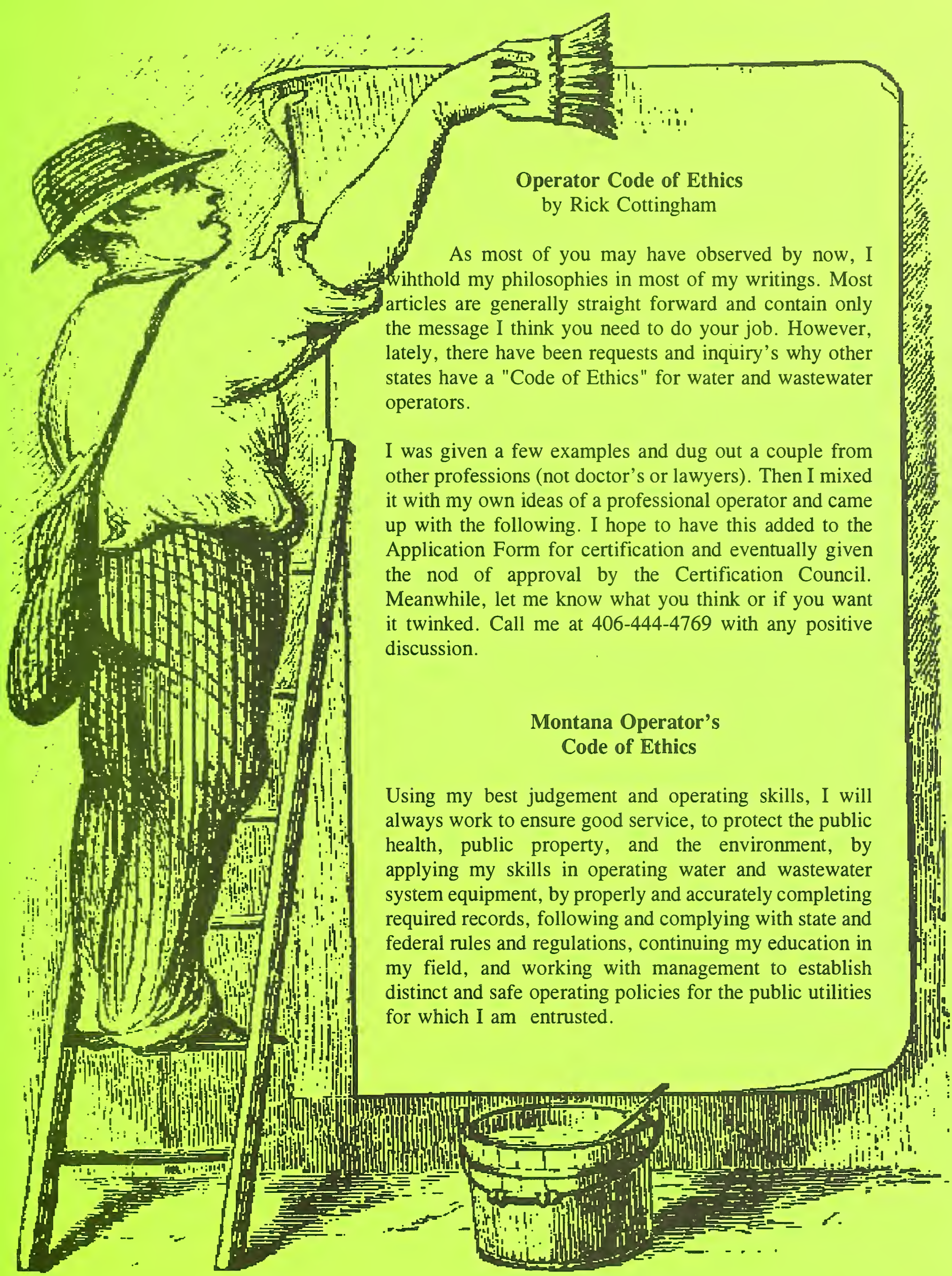
Plant or equipment start-ups involve a large amount of skill and small amount of luck. The skill portion of the project is normally not attributed to one person but to a group of people working together as a team. Personality conflicts between Engineers, Operators, Owners, Contractors or Manufacturers should be put aside and the outcome of the project should be placed first so a cooperative spirit is maintained throughout the project. Operator involvement during the design phase is another important facet to a successful project. Operators can sometimes see areas of conflict on the plans that could easily be corrected. Early corrections of conflicts will help avoid problems during a start-up. It is easier to change a line on a piece of paper during the design phase than it is to change a pipe or structure after it has been constructed.

During the start-up phase, communication, cooperation and training are the key elements for success. Normally different processes are being placed on line at the same time and/or various equipment is being tested, therefore, communication between the different parties is important to insure pumps are not operating against closed valves or tanks are not overflowing.

Operator training is necessary if the plant is to function properly after the Contractor and Engineer have left the site. It is the responsibility of the Engineer to insure that the Operators receive the proper training by skilled instructors. These skilled instructors must be supplied by both the Engineer and Manufacturer and they must have the knowledge to intelligently answer Operator questions. The Engineer must instruct the Operators on the process controls, design intent, and describe the entire system. The Manufacturers must provide training on their individual pieces of equipment and insure that all maintenance and safety aspects are reviewed.

Another inportant aspect to a successful start-up is Operator safety. Safety considerations are important factors that must never be overlooked and they must be incorporated into every design. Also, safety meetings with the Operating staff, Engineer and Contractor during the construction phase is a necessary requirement to insure safe working conditions are maintained throughout the project. Start-ups will proceed more efficiently when everyone has a safe working environment and they can concentrate on the commissioning aspects of the project.

Luck plays a part in every start-up especially since unknown situations exist during every start-up. The amount of luck required depends upon how well the events during the design phase and construction phase were handled. If good detailed contract documents were prepared and there were excellent communication and cooperative skills performed throughout the project, then the quantity of luck needed at the start-up phase will be diminished.



Operator Code of Ethics

by Rick Cottingham

As most of you may have observed by now, I withthold my philosophies in most of my writings. Most articles are generally straight forward and contain only the message I think you need to do your job. However, lately, there have been requests and inquiry's why other states have a "Code of Ethics" for water and wastewater operators.

I was given a few examples and dug out a couple from other professions (not doctor's or lawyers). Then I mixed it with my own ideas of a professional operator and came up with the following. I hope to have this added to the Application Form for certification and eventually given the nod of approval by the Certification Council. Meanwhile, let me know what you think or if you want it twinked. Call me at 406-444-4769 with any positive discussion.

Montana Operator's Code of Ethics

Using my best judgement and operating skills, I will always work to ensure good service, to protect the public health, public property, and the environment, by applying my skills in operating water and wastewater system equipment, by properly and accurately completing required records, following and complying with state and federal rules and regulations, continuing my education in my field, and working with management to establish distinct and safe operating policies for the public utilities for which I am entrusted.

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